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POPULAR FALLACIES

UNIV. OF MICH.

KINGFISHER'S NEST.

(The Tunnel to the Nest is shown in Section.)

(*See p.* 89.)

POPULAR FALLACIES

BY

A. S. E. ACKERMANN

G. P. PUTNAM'S SONS

PARIS, NEW YORK, TORONTO AND LONDON

POPULAR FALLACIES

BY

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WITH EIGHT FULL-PAGE PLATES

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MCMVII

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To my Father

WHO EARLY TAUGHT ME BY PRECEPT
AND EXAMPLE THE HABITS OF A STUDENT-LIFE
WHICH IS ONE OF THE HAPPIEST IT
IS POSSIBLE TO LIVE

Folk-Lore
Soc.
1-6-1928
15873

"To err is human."

"To unlearn is harder than to learn."

"I am rubbing their father out of my children as fast as I can," said a clever widow of rank and fashion.

"Sometimes while writing my weekly pars I feel a trifle depressed to think that, while many others as well as myself are doing their best to teach the people the advantages to life that follow obedience to the golden rule of health, the seed may all too often fall on stony ground. People nowadays are usually so willing to hang just as they grew. *They are influenced by innate fallacy*, if not superstition, and hate innovations, even if assured by scientists that these may tend to their comfort and longevity. I do not know if ever I told my readers of a landlady of mine when a student in Ireland, who would never wash her face until Saturday, when she could afford a drop of whisky to rub it afterwards for fear of catching cold. Well, she is one of my examples of thousands and tens of thousands who are content to live and die behind the dark curtain of ignorance. However, I am cheered by the thought that the next generation will be more sensible and more amenable to logic and reason. As regards cheerfulness and light, these ought to go hand-in-hand. Indeed, if one has a well-balanced mind and healthy body he cannot be for any length of time in the fresh air and sunshine —or, failing sunshine, good honest daylight—without feeling happier and calmer. We should remember that tranquillity is one of the first signs that an invalid is getting well and strong. My advice to all such is to look upon sunshine or light by day as a friend, but to sleep in the dark. Darkness is essential to sound slumber."—Dr. GORDON STABLES, R.N., in the *Yorkshire Weekly Post* of Nov. 21st, 1896.

PREFACE

SOME time ago the author vainly tried to obtain a book on Popular Fallacies, which would not merely state the fallacies, but would also, as far as possible, prove them to be fallacies by the use of a little elementary science, such as most of the younger generation now have great facilities for acquiring.

No such book appears to exist, though there are several which, to a limited extent, deal with the subject amongst a large amount of other matter not coming under the head "Popular Fallacies," but these books being about fifty years old, the author ventures to place the present volume before the public, hoping that they may be amused and instructed by it, even as he has been in the preparation of it during the last thirteen years.

Superstitions have been avoided, for they cannot be satisfactorily treated in the same manner as fallacies, and will have to die a lingering death as the general education of the masses improves.

The chief distinction between a superstition and a fallacy that has been herein adopted is that a superstition involves, or is said to involve, the supernatural, whereas a fallacy is entirely mundane in character, and hence can be dealt with by the known laws of nature.

Where possible, the probable cause of the fallacy has been suggested.

Necessarily, in some cases it has been difficult to come to a satisfactory conclusion, owing to the want of careful experiments or further information. Again, no doubt there are many fallacies which the author has been unable to hear of, and others, which are given, which some readers will not have fallen into the error of believing; but, on the whole,

everyone will find some of his or her pet ideas to be fallacious!

The author will be very grateful for lists of other fallacies, and references and information on the subject in general, and he here wishes to thank those friends whose kind assistance in this manner has made the publication of this book possible. He particularly wishes to thank (1) Mr. F. H. Hummel, M.Sc., A.M.I.C.E., of the University of Birmingham, for reading the MS., classifying the fallacies, and many valuable suggestions; (2) an old college friend, who is now a consulting physician, for his assistance with the medical section; and (3) Miss L. P. Steele-Hutton, M.A. (St. Andrews), for kindly revising the historical section.

Where quotations have been made, the authority and reference are given. The author desires to thank the various authors and publishers for kindly granting their permission for the extracts to be made, and especially wishes to acknowledge the assistance he has had from "Popular Errors" (published in 1857), by Mr. John Timbs, F.S.A., and "The Mistakes We Make," by Mr. C. E. Clark.

25, VICTORIA STREET, WESTMINSTER.
Sept., 1907.

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POPULAR FALLACIES

DOMESTIC FALLACIES

(a) GENERAL

That a Thaw Bursts the Water Pipes

WHAT really occurs is: The pipes are burst by the expansion of the water just as it congeals into ice, and as long as it remains ice there are no unpleasant consequences (except that no water can pass through the pipe); but when the thaw takes place the ice melts, and the water pours out of the rent in the pipe, which may have been made days before.

The expansion due to the freezing of water is easily illustrated by placing a tumbler brimful of water on an outside window-sill on a calm frosty night. In the morning the ice will be found projecting above the rim, or it may have burst the glass.

If during the next long and hard frost you will take the trouble to examine the water-pipes that are frozen, you will find some of them burst, or at least swollen (if lead), and then the next frost will burst them. Should you be successful in your search, the turning off of the cocks on the cistern, or at the main, will somewhat mitigate the unhappy lot of paterfamilias when the thaw does take place.

That a Poker Resting on the Top Bar of a Grate and Pointing Up the Chimney Draws Up the Fire

For the poker to increase the draught, or cause a draught, it would have to be hotter than the gases which surround it, in which case the gases in the immediate neighbourhood of the poker would become less dense, and hence rise; but the poker can never be hotter than the surrounding gases, though it may *feel* so, because it is a better conductor of heat than the gases (*vide* Fal. No. 2, p. 47), for it is due to them and the radiation from a feeble fire that its temperature is higher than that of the room. On the other hand, placing the cold poker in the gases would

cool them, and tend to produce a down draught by a reversal of the process explained above, until it attained the same temperature as the gases, when, from a temperature point of view, it would have no effect. It would, however, still hinder the draught to a slight extent, for consider a number of pokers so arranged; they would materially reduce the area of the flue, much in the same way as nearly closing the register, which, of course, reduces the draught.

Putting the poker *in* the fire, and then lowering the handle so as to raise up some of the coal and form an inlet for fresh air, which contains the oxygen necessary for the combustion of the fuel, is quite a different thing, and does assist to "draw up the fire"; and, with this object in view, some ingenious person has made a hollow poker, which, no doubt, on being placed in a fire, supplies the inner portions of it with a small quantity of fresh air.

Some try to justify the practice of resting the poker on the top bar of the grate by saying that holding a newspaper over the top portion of the fire-place also draws the fire up. But the principles involved in the two cases are quite different. In the latter all the air is compelled to pass *viâ* the ash-pit and front fire-bars through the fire, and none of it merely passes over the fire and thence up the chimney. Some fire-places are constructed with iron doors which can be closed so as to act like a newspaper placed as described.

This fallacy may have arisen by confusion with the well-known experiment of burning a bit of candle in a lamp-glass. The candle is placed upright in a little dish of water (to make an air-tight joint), and the lamp-glass is placed vertically over it. In a short time the candle goes out, or burns very feebly, owing to the lack of oxygen. A current of hot air tries to escape at the top, but it is prevented from so doing by an equal volume of cold air trying to get in and take its place. But if a piece of cardboard, cut into the form of a broad T, be placed in the top of the chimney so as to divide it into two vertical channels, then an up-current will start on one side of the cardboard, and a down-current on the other, and the candle will burn brightly.

It has been said that the poker forms a cross with the top bar of the grate, and this keeps the Devil away; but one would have thought that the Prince of Fire would have

helped matters, and therefore to keep him away seems a mistake!

There is no such action as the attracting of the flue gases up the chimney after the manner of a magnet attracting pieces of iron, and we would suggest to those who believe in and practise the "poker trick" that they should attend to and make up the fire in the same careful manner as they do before putting the poker in the fascinating position, and then *not* so place the poker. Or, again, try putting the poker in position without making up the fire, and see then whether it will draw the fire up!

Herbert Spencer says that a person who believes in this alleged action of a poker has no quantitative or qualitative idea of physical causation!

That a Thick Tumbler Stands Hot Water Better than a Thin One*

Glass is a bad conductor of heat, and when the hot water is poured into the thick glass tumbler the inner layers of the glass are soon at a much higher temperature than the outer. But the higher temperature causes a greater expansion, and hence the outer layers are burst by the expansion of the inner ones. In the case of a thin tumbler, or chemist's glass beaker, the whole thickness of the glass is raised to practically the same temperature almost at once, and consequently all the parts expand equally at once, and no excessive stresses are produced.

The above actions are more marked if we try to warm a thick glass tumblerful of water over a gas jet, for then the difference of temperature between the inside and outside layers is very great, and it is almost certain to break the glass; but a thinner tumbler—or, better still, a glass beaker—will not be harmed in the least.

This fallacy has arisen by our thinking (when comparing the glasses) of the comparative forces, or of the blows that would be required to break the tumblers; for by this test, of course, the thick tumbler would be the stronger, provided it had no initial internal stresses due to bad annealing. Such internal stresses are well illustrated in Prince Rupert's drops, which fly into innumerable pieces as soon as the small end is broken.

* See "Elementary Lessons in Logic," by Stanley Jevons, M.A., F.R.S., p. 257.

That Moths Eat Clothes

This fallacy is somewhat akin to the one that a thaw bursts the water-pipes, for in the latter case when the thaw comes then also comes the inconvenience of burst water-pipes, and in the former, when the clothes are taken out and found moth-eaten, moths fly from them, and the too-ready conclusion is that the moths have eaten them. What occurs is this: The clothes-moths lay eggs on suitable materials, these eggs develop into larvæ or grubs, which eat the clothes. The larvæ then change into pupæ, each forming a tiny cocoon (similar to that of a silk-worm) for itself, and after some time the cycle of changes is completed by moths emerging from these cocoons, which may be found among clothes that have been badly moth-eaten. So we see that the moths which fly out on the clothes being disturbed are quite innocent of the harm that has been done up to that time; but if left, they will of course lay eggs, and the resulting larvæ will start operations at once.

An entomological friend told us a very amusing experience of his in connection with this fallacy. He gets his friends to collect moths and butterflies for him, and on calling one day at the house of a fair collector, she showed him a very fine living specimen of the Emperor moth (Saturnia Pavonia Minor), which she had caught for him. Not knowing how to kill it, she had kept it alive for several days, and, moreover, out of the kindness of her gentle heart, she had fed it. On being asked what she had fed it on, she replied ingenuously, "Oh, I gave it a bit of old rag to eat!"

Some moths do not eat anything, but have sufficient vital force to fulfil their mission in life, and then die. Others sip the nectar from flowers, and it is the flowers that open at night that are most strongly scented, so as to attract the moths by their sense of smell, that of sight being useless in the dark.

That Cats Suck the Breath out of Sleeping Children

We are very sorry that this serious charge is brought against poor puss, one of the cleanest of animals, from which many human beings even might take a lesson.

Well, let us explain, and, we trust, soften the hearts of her accusers. The cat, liking a warm, clean place, finds

this in a child's cot, and if the cot be narrow, so that there is no room for puss to nestle alongside the child, occasionally she takes up her position on the baby, and her mouth may by a still less chance happen to be near the child's mouth. Now consider for a moment the ratio of the weight of the cat* to the weight of the child; it is something considerable, and if we imagine a proportionate weight on our own chest, we shall begin to realise that it is a serious matter. Again, if the mouths of the baby and the cat are near one another, the child is probably not breathing air as fresh as it might be.

Lastly, the formation of the cat's mouth makes it impossible for it to interrupt respiration by the mouth and the nose of the child at the same time. Hence we see that while it is by no means desirable to let a cat sleep on top of a child, when this does occur it is not from any malice prepense on the part of puss.

We have only one record† of a child having been thus killed, though we have statistics of thousands of cases of children being overlaid by their drunken parents, and the infantile mortality from this cause is markedly higher on Saturday and Sunday nights, when drunkenness is more frequent.

It was Carlyle who said, "The more I see of men, the better I like dogs."

That the Sun when shining upon a Fire in a Grate puts it out ‡

John Timbs, in his "Popular Errors," quotes some experiments of Dr. M'Keever which would tend to show that the above is not a fallacy, though by these experiments the rate of burning in sunshine to the rate of burning in a dark room is only as ten to eleven; but the author does not consider these experiments as quoted at all satisfactory, for the above result appears to have been obtained from a single

* The author's tom cat weighs 13 lb. 11 oz., while the following are the average weights of babies: one month old, 8 lb.; four, 12½ lb.; eight, 18 lb.; twelve, 22 lb.

† SUFFOCATED BY A CAT.—An infant was suffocated in Birmingham on Wednesday night under strange circumstances. Soon after it was put to bed, a cat belonging to the premises jumped on the bed and settled down on the baby's face. When the cat was turned off the child was found to be dead.—*Daily Mail*, 7th April, 1899.

‡ See p. 264.

experiment, and that was the burning of only one inch-length of a common candle. Besides, in the dark room there were probably hardly any air currents, whereas in the sunshine there may have been a considerable draught, and while a draught makes a candle "gutter," the actual consumption of wax is less, for the temperature of the flame is reduced by the wind, and we all know how small a candle flame becomes in a strong draught.

The experiment of Dr. M'Keever has been repeated by Prof. Le Conte, of the United States, who has found the rate of combustion to be sensibly the same in the dark and in the sunshine; yet it varies from day to day, according to the density of the air. For details, see Well's "Annual of Scientific Discovery" for 1858, pp. 198-203.

Now let us see what can be said for or against the above heading. If it be a bright sunny day, whether in the autumn or winter, one does not feel so cold as on a day (of the same temperature) which is damp and dull; consequently the fire does not receive the assiduous attention it does on the dull, damp day, and it expresses its feelings, caused by this neglect, by going out (not to the club) or getting very low (spirited). Again—for the same reason that we cannot see the stars or planets by daylight—the contrast between the fire-light and the bright sunlight is not so great as between the fire-light and the dim light of the dull day; hence the fire *appears* to be burning less brightly when the sunlight is on it than it really is; and if you will take the trouble, next time the opportunity occurs, of pulling down the blinds so as to darken the room, you will find the fire appears brighter *at once*. It could not have "burnt up" in the minute it took you to let the blinds down. Furthermore, when a piece of coal gradually burns, it becomes coated with a layer of ash. Now when the room is dark we see the glowing coal shining through this ash, but if the sun's bright light shines upon the outside of this ash, we see the ash by "reflected light," as it is called (whereas before we saw it by transmitted light), and the glowing coal within is scarcely visible.

Thus far our arguments are in favour of it not making any difference in the rate of combustion whether the sun be shining upon the fire or not. The only effect that may tend to slightly reduce the rate of combustion is that the

heat of the sun would slightly rarefy the air in the neighbourhood of the fire, and then there would not be the same amount of oxygen per cubic foot of air passing through the fire. Be this as it may, Tyndall and Frankland made the experiment of burning candles in a valley (where the air is dense), and then on top of a high mountain (where the air was rarefied), and they found that the same weight of candle was burnt in the same time in either place, but that the light emitted was greater when the candles were burnt in the valley.

As a further illustration of the apparent ability of one light to dull another, we may mention that when we were up in the Great Wheel at Earl's Court, at night, the lights of London became instantly more distinct the moment the electric light in the car was extinguished; but surely nobody is so foolish as to think that the lights in the car partially put out those of London?

That the Sun shining into a Room raises the Dust

It is impossible with the naked eye to see dust by ordinary light—or diffused light, as the correct term is—but when the particles of dust are highly illuminated, as by a beam of sunlight coming into the room, or by the powerful rays of the electric search-light, they are visible; but they were there just as much the moment before the beam passed that way. In fact, the error has risen on the principle, "Out of sight, out of mind." If the atmosphere were perfectly free from dust we should not see the characteristic beam from the searchlights, or the sunbeams as they are so often depicted in views of the interiors of churches. Indeed, the diffusion of light would be greatly reduced.

That the Blackening of Ceilings over a Gas Light, or Lamp, is entirely due to the Carbon (Soot) in the Gas or Oil

Dr. H. E. Armstrong, F.R.S., says it is the current of air (induced by the flame) which causes the particles of dust in the air to impinge on the ceiling and stick there, and that a small fan, producing a current of air, would have a similar effect. This statement is certainly borne out by the fact that a crack in a door, or wooden partition through which a current of air passes, always gets very black and dirty. Of course, if you deliberately make the gas smoke,

it will supply so many more particles of dirt (in this case carbon) to stick on the ceiling.

Again, this blackening effect may be seen over hot-water pipes and radiators.

That the Pendulum Works the Clock

If this be so, why do we wind the clock up and not the pendulum?

If you hang a weight on the end of a piece of string, the other end of which is fixed to a support, you have a rough pendulum; but surely no one thinks that this would go on oscillating for an indefinite time? What occurs is that the resistance of the air and the slight inflexibility of the string ultimately bring this pendulum to rest. If we wish to keep it continually oscillating we must periodically give it a small impulse, and this is done in a clock by the mainspring acting, through the train of wheels, the escapement pallets and the fork of the crutch. The crutch is a light rod attached to the pallets, which reaches down the pendulum for some distance and is then twisted loosely round it. Every time the pendulum moves to the right or left, it receives a slight impulse from this rod.

If the normal period of vibration of the pendulum is not to be altered, this impulse must be given at the middle of each swing—*i.e.* when the pendulum is just in the vertical position of its swing.

The use of the pendulum is to govern the clock, and it does so because all pendulums have perfectly definite periods of vibration which for a given place on the Earth depend only on the length of the pendulum, the shorter ones vibrating more quickly than the longer ones.

That it is Impossible to Get a Fruit Stain out of a Cloth until the Fruit is out of Season

This mistake may have arisen because a very long time is required to get some stains out by the ordinary process of washing—so long, in fact (a table-cloth or serviette usually being washed once a fortnight, as one week is spent at the wash)—that the fruit may happen to be out of season by the time this has occurred; but we must not say, "Therefore it is impossible to get the stain out while the fruit is in season." If the mere fact of the fruit being in season prevented its stains being got out, then

we could argue that the stains of some fruits should never come out, for some fruits are always "in season" in one part of the world or another. Again, if it depended on the fruit going out of season, then those stains which were made late in the season should come out at the same time as those which were made in the early part of the season; that is, directly the fruit goes out of season!

For the sake of those who may still be sceptical we made the following experiment:—An old linen handkerchief was deeply stained all over by having a number of blackberries crushed and rubbed into it. It was then allowed to dry, and three days after the staining it was torn into several portions, one of which was then washed with "Sunlight soap" and cold water, and put in the sun to bleach. This was repeated four times at intervals of a few days, thus being equivalent to eight weeks of ordinary washing (*vide supra*), and yet the staining was by no means entirely removed (but you see the fruit was in season still!) Another portion after having dried for a week was treated with strong acetic acid for some hours, and then washed in plain water. This scarcely removed any of the staining. Another portion was wetted and submitted to the fumes of burning sulphur (which, with the moisture, would form sulphurous acid, and some sulphuric acid). This very nearly removed all the stains, and might have done so completely had the staining been of the ordinary nature.

Lastly, one of the original portions, which had been left dry for a fortnight, was wetted, powdered oxalic acid (the so-called "salts of lemon") sprinkled on it, and the fabric rolled up and kept moist for some twenty-four hours. It was then washed in plain water, and the same treatment repeated once, by which time the stains were completely removed, the fruit being still in season!

We have given the unsuccessful experiments to illustrate how easily one who believes in this fallacy might confirm an erroneous belief; for the first three trials failing to remove the stain, one would be almost certain to conclude that they could not be obliterated till the fruit was out of season. On the other hand, the author feeling sure that the common statement was incorrect, was determined to find something that would remove the stain while the fruit was in season.

Another fallacy connected with staining is that common salt put on the stain directly it is made has a chemical action on it, whereas it merely acts as a sponge, sopping up the fluid colouring matter and thus preventing it making a larger and deeper stain.

Oxalic acid, which successfully removed the deep blackberry stains in the foregoing experiment, is also useful in the case of ink-stains or iron-moulds; but perhaps the most successful treatment for an ink-stain is the application of milk if it is put on at once. Should an ink-pot be dropped on a carpet, remove as much of the ink as possible by means of a spoon or blotting paper. Then saturate the spot thoroughly with milk, using perhaps a pint of it. After some time, remove the milk by blotting paper, and rub the carpet with a clean cloth.

That Steam is Invisible

What we see issuing from a safety-valve or a steam-cock on a boiler, or from the spout of a kettle, is *condensed* steam, which consists of an innumerable number of tiny globules of water, and thus is exactly similar to a cloud in the sky. Experimental boilers are occasionally made with plates of glass in places, so that we may see the invisible steam, as some Irishmen would say, for steam is as invisible as the air. When steam is very rapidly issuing from a cock on a steam boiler, there is nothing visible close to the cock; but as we look farther and farther away from the tap, the white condensed steam becomes more visible. This phenomenon occurs to a slight extent even with an ordinary kettle when it is boiling very fast.

That the so-called "Tin" Utensils are Made Entirely of the Metal Tin

Tin-plate is iron or mild-steel plate which has been chemically cleaned, and then dipped into a bath of molten tin, withdrawn, and allowed to cool.

When a piece of new tin-plate is cut with shears, we cannot distinguish between the colour of the iron and the outer layers of tin at the cut edge, and this is misleading; but when a piece of tin-plate rusts, we see the brown-red iron-rust breaking through the layer of tin in small patches. Tin itself oxydises only slightly, the oxide being white.

That certain Gas and Oil Heating Stoves "Consume their own Smoke"

By "smoke," we take it, is meant "products of combustion," for such heating stoves are not, as a rule, intentionally allowed to produce visible smoke.

Whether the fuel be coal-gas or oil, the products of combustion are carbon dioxide, water-vapour, and traces of other substances. The carbon dioxide is the chief deleterious product which must be got rid of, and no amount of reburning by mixing it with fresh air supplied to the flame will convert it into anything else but carbon dioxide. Hence these stoves should always be provided with chimneys which communicate with the chimney of the ordinary fire-place in the room; or, if the stove be in a hall or bath room, it should have a flue of its own communicating with the outside of the house.

There are several contrivances for rapidly heating water in a bath-room, which consist principally of a coiled pipe through which the water passes, and a large number of gas jets to heat the coil. The apparatus is usually placed in the same corner as the bath, and some two feet above the latter. Bath-rooms are not usually very large, and in winter when the heater is most used the window is closed. Consequently, if the heater is not provided with a proper chimney, the percentage of carbon dioxide in the air of the bath-room is raised enormously.

The apparatus being just over the bath, and the carbon dioxide being heavier than air, it tends to collect in the bath; hence it is that several deaths have occurred where these heaters have been used without proper chimneys. An account of one such death (and nearly a second) which occurred at Kirkgate Station, Wakefield, appeared in the *Daily Mail* of 14th October, 1902.

Sometimes an ignorant or unscrupulous salesman of gas-stoves will say that his stoves condense all the products of combustion, and in "proof" of his statement he will call attention to a tray with some water in it underneath the stove. This argument is particularly popular with that form of stove which has a luminous flame and two vertical bright copper tubes, one at each side of the stove. The water in the tray is the condensed water-vapour produced by combustion, but it contains only a trace of the carbon

dioxide which is the really objectionable product of combustion, and which always escapes into the room, unless a proper chimney is fitted to the stove. Chimneyless gas-stoves appear in their true light in the report (December, 1906) of the Coal Smoke Abatement Society on their tests of twenty-five gas-stoves.

That a Million Defaced English Penny Stamps will get a Patient into a Hospital, or a Child into an Orphanage

One frequently sees in the "Answers to Correspondents" of various weekly periodicals replies refuting this extraordinary idea. When questioned on the subject many people seem to be very hazy as to the exact method of procedure for getting the patient in when the stamps have been collected. Once we were sweetly asked to collect these penny stamps, and with eager haste we inquired for what purpose. "Oh, a girl friend is collecting a million." "Whatever for?" (Expecting the "orphanage reply"!) "Because her uncle has promised her £50 if she has the energy and patience to collect them before the end of ten years." Our hopes were dashed to the ground, and we had to console ourselves by thinking what a pity the uncle did not direct his niece's energy into a more profitable channel, and by wishing we had so generous an uncle. (*Entre nous:* we are assisting in the collection of those stamps. How could we refuse?)

It is interesting to note that a million is roughly three hundred a day for ten years, or three thousand a day for one year!

P.S.—Since writing the above we have seen the fair collector clipping the paper off the old stamps with a pair of nail scissors, and making them into parcels of fifty. Four edges to each stamp, four million clips; one second to each clip, four million seconds, one thousand one hundred and eleven hours. Supposing she works ten hours a day (in spite of the eight-hour movement), this amounts to eighteen and a half weeks, or over four months of precious time.

The fallacy may have arisen through certain competitions instituted by some of the weekly magazines. For example: On page 17 of the *Home Companion* for 17th November, 1900, £1,000 was offered in prizes for the biggest collections of old stamps. The editor stated that he wished to send 40,000,000 old postage stamps that year to the orphans

in the Asile des Billodes Orphanage, Switzerland, having sent 30,000,000 the year before. It is explained that the orphanage receives from all parts of Europe gifts of old stamps, which are then sold to dealers, and many hundreds of pounds sterling are said to be thus added to the institution's funds. Whatever doubt there may be in this matter, it is not as to why editors take this trouble, for Rule 2 of the competition states that, "If you want to contribute more than twenty (the number of spaces provided on the coupon) stamps each week, you must buy extra copies of this paper."

A similar competition, conducted by the *Sunday Circle*, was advertised in the *Daily Mail* of 14th November, 1902.

That when you Burn Yourself the Part should be held before a Fire to "Draw out the Inflammation"

This may be the homœopathic treatment, but it is not recommended. In treating a burn the chief aim is to prevent the air getting to the injured surface; and for this purpose smear carron oil (a thorough mixture of equal parts of lime water and linseed oil), boracic ointment, or salad oil over the burnt part quickly and carefully.

That it is Good to Use Cobweb to Stop a Cut from Bleeding

You may thus stop the bleeding, but the last state of that man who was losing blood will probably be worse than the first, for you could scarcely get anything more likely to cause blood-poisoning or disease than the dirt (containing disease germs) with which all cobwebs are infested. Here is a case mentioned by Dr. Percy Frankland, F.R.S., in "Our Secret Friends and Foes." "As a small child happened to cut its finger with an ordinary kitchen knife, its father endeavoured to stop the bleeding of the wound by binding it up with some cobwebs, a superstitious practice which would be more honoured in the breach than the observance, for the child developed nearly a month later typical symptoms of tetanus (lock-jaw).

"It was proved beyond doubt that the spider's web was responsible for the mischief; for rabbits and guinea pigs, innoculated with some web from the same place, died under particularly well-defined symptoms of tetanus. Doubtless the spores had been caught in the web, conveyed thither

by some chance current of air, and had remained contentedly attached until the opportunity came to them for exercising their disastrous powers."

An account of a woman, who appeared as complainant in a Tiverton assault case, with a large cobweb on her head as a bandage, was given in the *Daily Chronicle* of 31st May, 1906.

If it be an ordinary cut in which no artery or vein is injured, the bleeding is technically known as "oozing," and to stop this, use ice or ice-cold water. If this fail, then try hot water (it is no use merely warm, and must certainly not be too hot either; about 120° F. will be found satisfactory), so as to coagulate the blood. Or a solution of ferric chloride or of alum may be used. Dress with clean water, to which a few drops of carbolic acid or a little permanganate of potash (Condy's fluid) have been added.

Do not give brandy ; it only excites the heart, and causes it to pump the blood out all the faster, and do not dress the wound with wine and salt or tobacco.

Anyone wishing to know exactly what to do in emergencies of this kind, should attend a course of lectures (3s. to 10s.) on "First Aid to the Injured," given under the auspices of the St. John Ambulance Association, whose headquarters are at St. John's Gate, Clerkenwell, London, E.C. Chapter IX. (Emergencies) of Dr. Reynolds' excellent little book on Hygiene contains some most valuable information.

That Sugar is Bad for the Teeth

Dr. Vaughan Harley, in the Physiology Section of the British Medical Association (July 30th to August 3rd, 1895), read a paper upon "Sugar as a Food," and in addition to praising its virtues, he denied some of the vices generally ascribed to this substance. The popular view that sugar ruins the teeth is not borne out by observation. People accustomed to take large quantities of sugar are not more liable to have bad teeth than their most abstemious neighbours, but, on the contrary, have in many cases exceptionally fine ones. In support of this contention Dr. Harley cited the negroes of the West Indies, who are in the habit of taking large quantities of sugar, and whose teeth are unexcelled as to soundness and whiteness.

Dr. Gordon Stables, R.N., had the following note in

the *Yorkshire Weekly Post* of Saturday, November 21st, 1896:—

"PARAFFIN WAX VERSUS REAL SWEETS"

"If we wait for tradespeople, or manufacturers rather, to become honest, we shall have to wait a long time. Now, pure sweets are very excellent for children, and help to keep them plump and bonnie. Chocolates, if pure, are beyond praise, so is good butterscotch. But bairns should never be given pennies to go and buy for themselves. Their choice will fall, for a certainty, on gaudy goods, or poisonous, and the result may be fatal. Just read this: 'What fearful and wonderful compositions children eat! At Birmingham yesterday, three confectioners were fined 40s. and costs for selling "chocolate chumps" which contained paraffin wax, an ingredient injurious to health.' The evidence showed that the sweets contained 3½ per cent. to 5½ per cent. of wax, and no chocolate; and the City analyst stated that the wax was probably more indigestible than india-rubber or a paving stone. It was stated for the defence that the wax was used merely to protect the sugar-stick from damp, but the magistrates looked on the offence as a serious one. The prosecutions were instituted by the Health Committee."

Of course, as Dr. Stables points out, discretion must be exercised, for all sweets are not wholesome, not on account of the sugar they contain, but on account of the pernicious substances (such as chromate of lead, arsenic, sulphate or barium, &c.) with which they are sometimes coloured or adulterated. All highly-coloured sweets should be avoided.

Lastly, it may be pointed out that all the starch we eat (bread, rice, potatoes, &c., contain a large quantity of starch) has to be converted into sugar before it can be absorbed by the system, and this conversion begins in the mouth, owing to the action of the ptyalin of the saliva on the starch, and is completed in the intestines (not in the stomach).

That it is Bad to Bathe in Cold Water when you are Hot

In answer to our inquiry Mr. F. H. Lane, M.R.C.S., replied: "No; on the contrary, it is better to bathe when hot, than to wait till the body is cold." And from the

instructions, issued by the Royal Humane Society, we quote the following :—

"Bathe when the body is warm, provided no time is lost in getting into the water.

"Avoid bathing when the body is cooling after perspiration."

The following letter appeared in the *Daily Mail*, of 21st January, 1907 :—

"SIR,—In the *Daily Mail* report of the inquest on the sad death of the lady who was drowned in the Hampstead Heath pond, one of the witnesses gave as a reason why he did not enter the water that he 'was hot.'

"May I point out that it is quite a mistake to think you should not enter the water when warm ; as a matter of fact, the opposite is the truth, and you should not wait to get cool.

"ALFRED ROWLEY,
"Honorary Secretary of the
Serpentine Swimming Club."

In the case of Turkish baths, it is the usual practice to plunge while hot into a cold swimming bath, or to have a cold spray bath.

Some further information on this matter will be found in "Hours of Exercise in the Alps," by Professor Tyndall, F.R.S.

That the Nails of Animals are Poisonous

The idea that persons retain poison in their nails is traced by Sir Henry Halford, in a learned paper on the "Poisons of the Ancients," to the following statement as to the cause of the death of Alexander the Great. Alexander is said to have been poisoned, and the report is that the poison was sent by Antiphon, and was of such a peculiar nature that no silver or metallic vessel would contain it, and that therefore it was conveyed in the hoof of a mule. But the vessel was really of onyx, as Horace says:— "*Nardi parvus onyx.*"

Now the word "onyx" (Greek) signifies not only a stone, but unguis, a hoof or nail; and the second sense had evidently been given instead of that of the precious stone. This double meaning of the term onyx Sir Henry Halford considers to explain the error concerning poison being retained by persons in their nails.

To the question, "Are the nails *per se* of animals poisonous?" Dr. Torry, M.R.C.P., replied as follows:—

"No; not *per se* absolutely; but a wound so caused may be fatal, from the claw-nail being charged with poisonous matter. It might so cause rabies, pyæmia, &c. Under the cleanest condition of a nail, a wound by it would not be a simple incision like the smooth cut of a sharp instrument, which generally heals by what is technically termed the 'first intention'; it would be a rough, jagged wound, termed 'laceration,' slow to close, liable to the formation of purulent matter, and therefrom to blood-poisoning with its many complications."

Dr. Charles Warden replied: "Germs exist everywhere, especially where there is dirt, and very likely so exist about the nails, and therefore it is almost impossible to keep them aseptic; but a perfectly (chemically) clean nail should be harmless."

We believe Lord Lister, Past P.R.S., made the experiment of washing hands in various antiseptics and disinfectants, sometimes in a series of them, and then scraping a very small quantity of matter from under the nail (not the nail itself), and putting it into a cultivation medium, and in all cases bacterial life showed itself.

That Scarlet Fever and Scarlatina are Different Diseases

This is one of the dangerous fallacies; that is to say, acting on this belief people may do themselves or others much harm. It is absolutely the same disease; but if the case happens to be a mild one, many people most erroneously think it is not so contagious or even contagious at all, call it scarlatina, and then excuse themselves from taking the necessary precautions. *Vide* the fallacy that a mild case of an infectious disease can only communicate a mild case.

This fallacy is dealt with by Dr. E. S. Reynolds (M.D., Lond.), on page 200 of his "Hygiene for Beginners."

That Plenty of Space Does Away with the Necessity for Ventilation

There should be 1,000 cubic feet of space for each individual in a room, and, in addition to this, 3,000 cubic feet of fresh air should be introduced into the room per hour for each person. For example, if the room be 10 ft. long, 10 ft. wide and 10 ft. high, it contains the right number of cubic feet

of air for one person ; but it is wrong for him or her to sit or sleep in that room if every door, window, or crevice where fresh air might get in is closed up, and luted with india-rubber, felt, sandbags, &c. ; for 3,000 cubic feet of fresh air should be passing into the room per hour, and, of course, a corresponding quantity of foul air should be passing out through the chimney or the ventilator. If the room be 20 ft. long, 10 ft. wide and 10 ft. high, then it is suitable for occupation by two persons, if 6,000 cubic feet of fresh air be passed in per hour.

If the cubic space per individual be less than 1,000 cubic feet, then it is even more necessary to have thorough ventilation ; but if the air of a room be changed more than four or five times per hour, a draught will probably be felt.

It is found in practice that in ordinary dwelling-houses, the useful height of a room—from a sanitary point of view—is limited to 12 ft. Anything above that must be excluded when calculating for what number of persons the room is suitable.

That in House Drainage Perfect Safety is Afforded by a Trap

" That erroneous belief : among the public and ignorant workmen, that perfect safety is afforded by a trap, is responsible for many grave defects in house drainage." Dr. George Reid, D.P.H., in his " Practical Sanitation."

Traps are certainly necessary in connection with the sanitary fittings of a house, but they must be put in the right places, otherwise they may do more harm than good. The author in his practice has found a trap at the foot of a soil-pipe, where it joined the drain. The drain was properly connected to a fresh air inlet, but this trap made this inlet quite useless, and stopped the ventilation of the drain as well as of the soil-pipe. Even well-designed sanitary arrangements often get leaky at the joints, and, consequently, sanitary surveys should be made from time to time.

That Green Wall-paper is the Only Kind that is Likely to be Dangerous on account of it possibly containing Arsenic

" It is popularly supposed," says Dr. George Reid, D.P.H., " that green is the only dangerous colour, and that the sole precaution necessary is to avoid it ; this is an

absolute fallacy, for other coloured papers may contain arsenic.

"The medical dose of arsenic varies from 1/62 to 1/12 of a grain, and when one considers that wall-papers have been found to contain as much as 17 grains per square foot, the gravity of the question becomes apparent."

Dr. E. Lankester, M.D., F.R.S., in his interesting book, "The Uses of Animals to Man" (published about 1860), refers to the danger of green flock-papers, arsenite of copper being used in their manufacture. He says instances have not been rare of persons living in rooms where these green flock-papers have been used, with the result that when the paper has been brushed, the particles of arsenite of copper have been taken into the lungs, and produced injurious effects on the system.

That the Terms "Disinfectant" and "Antiseptic" are Synonyms

A disinfectant is a substance which, on coming in contact with the micro-organisms that produce disease, absolutely destroys them; whereas an antiseptic is a substance which, under similar circumstances, would merely hinder the increase of the micro-organisms, and not actually destroy them. A still weaker substance (such as permanganate of potassium) would simply act as a "deodorant," by oxidising some or all of the organic matter with which it came in contact.

Lastly, substances like the vapours of turpentine, burning peat, boiling tar, eucalyptus, charcoal, or camphor, merely mask the unpleasant smell, and are thus likely to be dangerous.

Solutions of corrosive sublimate (bichloride of mercury), 1 part in 1,000 parts of water, carbolic acid (phenol.), 1 part in 20, and a few proprietary preparations, such as "Izal," "Cyllin," and "Chloros," are the only practical chemical disinfectants.

That a Mild Case of an Infectious Disease is Capable of Transmitting only a Mild Case to Another Person

This is a most dangerous fallacy. As well might we say that because a certain wheat-field was very thinly sown with wheat, therefore the wheat gathered from it could not be so sown as to produce a close-set and fine crop of wheat.

The mildness of an attack of any disease depends almost entirely upon the state of our system at the time we become infected, and there is little doubt that we often become infected with the germs of some disease or another, and yet do not develop that disease because our systems are strong enough at the time to "nip the matter in the bud." Sometimes this may occur quite unbeknown to us; at others we may feel "a bit seedy" while the struggle between the disease germs and the white corpuscles of our blood is going on. In the other case, when we really develop the disease, the harmful germs gain the upper hand, and if this lasts, we die; but if after some time the white corpuscles win, then we recover.

Hence we see that a dose of infection that at one time may cause us to develop the disease, at another, may prove comparatively harmless to us. If we are in fairly good health when we become infected, then probably it will be a mild case; but if the system is very low at that time, then it will probably be a severe or even fatal case; hence the necessity of always paying attention to matters of health, and thus keeping the body in good condition.

That in Restoring the Apparently Drowned, or Suffocated, the Body should be Rubbed with Whisky

Here we have yet another example of a positively dangerous fallacy (an example that "a little ignorance is a dangerous thing").

Another fallacy in connection with the restoration of the apparently drowned, is to place the body on a cask or similarly shaped articles.

With regard to the irrationale of the whisky practice, it is most important to get the body dry and warm, but we all know how cold our hands feel if we pour either spirits of wine, or any other volatile fluid upon them. This is due to the rapid evaporation, and whisky has a similar, though less marked, effect. Hence it certainly would not warm the body, any more than sprinkling pepper on it would. The idea has probably arisen through confusing the effect of an irritant with the effect of heat. For complete instructions how to act in the case of a person apparently drowned, see the publications of the Royal Humane Society of 4, Trafalgar Square, London, W.C.

(b) FOOD

That Salt Water Takes the Salt out of Salt Meat More Quickly than Fresh Water

This is asserted by old sailors. In the old days of sailing ships, and in the earlier days of steamers, before they had large cold-storage rooms in which to keep a supply of frozen fresh meat, quantities of salt meat used to be laid in, and, previous to being cooked, it used to be tied up in a sack, a rope attached, and the sack slung overboard so as to trail in the water. By this means it was brought in contact with a large volume of water containing about 3·6 per cent. of saline matter, whereas the salt meat would be pickled in a saturated solution (35·0 per cent.) of salt, and usually would have crystals of salt sticking to it. Hence the percentage of salt in the meat would be greatly reduced, but it could never fall below the saltness of the sea-water. Now fresh water was scarce and expensive in those early days, and they could not afford to use a large quantity of it for washing salt meat in, so suppose they took a bucketful of fresh water and put a large piece of salt meat in it, in a short time the water would contain more than 3·6 per cent. of salt (the quantity in sea-water) and the meat on being eaten would be found to be salter than that treated by the previous method. Hence arose the fallacy; for it is ridiculous to suppose that if the salt meat were slung overboard in fresh water, as when going up a river, for the same time it would not be less salt than that treated in sea-water.

That only Mushrooms Peel

Peeling is one of the characteristics of the mushroom, but it certainly would not do to rely on this or any other single characteristic alone, for some other fungi besides the true mushroom undoubtedly peel.

When young the gills of the mushroom are rose-coloured, and brown-black when old. The gills never grow boldly against the stem, or run down it. On being broken, the flesh remains white, or nearly so. The cap has a frill at the edge; stem solid or slightly pithy (often with maggots in it). Small in size (say 4 to 5 inches in diameter as a maximum, though there is a variety which grows larger, but the flesh is coarse), dry, grow only in pastures and in exposed positions. The smell also is very characteristic.

Do not rely on these notes alone, but with them and the experience of gathering a couple of hundred with someone who is an expert, you ought not to make a mistake.

That Cutting Off Two or Three Inches of the Proximal or Stalk end of a Cucumber and then Rubbing the Two Portions together Takes away its Bitterness

This is obviously only a mechanical action; therefore, if the bitter substance is removed, it must be in the white froth which results from the rubbing; but we have tasted this white foam, and, while it is not particularly luscious, it is certainly not very bitter. Even supposing that the rubbing can cause any pumping or sucking action, how can we conceive of the bitter principle only being withdrawn and not the rest of the moisture and flavour of the vegetable? What gives the bitterness the convenient principle of coming out on the slightest provocation? And could we not apply the same principle to "the unruly member" by cutting off its distal portion (in this case), rubbing the parts together, and thus prevent it speaking any more bitterness? True, some cases would want a lot of rubbing, but still might be tried. Furthermore, if after following the instructions in the heading of this article, we cut off a portion of the distal end and rub these new surfaces together, we again get a white froth, which, according to the fallacy, we presume the first rubbing at the other end should have completely removed.

What we believe is this: The stork-end is formed of rather coarser material, and does taste more bitter than the rest of the cucumber, even when the whole has been peeled. Hence by cutting off and throwing away three inches of this end, we cut away the most bitter portion and prevent it being tasted.

That Cracking the Shell of a Properly Boiled Egg Directly it is Taken out of the Water Prevents it Going Hard

The idea in cracking the shell is evidently to prevent there being a pressure of steam within, which, if it were possible, would keep the substance of the egg at some temperature above 212° F. (the temperature of boiling water) for some time, whereas by reducing the pressure to atmospheric pressure the temperature falls more quickly.

Eggs are always boiled in an open saucepan, that is,

the lid is left off in order to prevent them cracking. The reason for this is that a tightly-fitting and somewhat heavy lid would cause a pressure of steam in the saucepan greater than atmospheric pressure, therefore the temperature of the water would be above 212° F., and in this case it would be possible for the fluids inside the egg-shell to be raised slightly above 212° F. (though never so much above as the water in the saucepan). This might cause the pressure in the egg to be above atmospheric pressure, and the shells to burst slightly when the external pressure was reduced to atmospheric pressure by removing the lid. But with an open saucepan the temperature of the water can never be above 212° F., therefore the temperature of the fluids in the egg can never be above 212° F., nor their pressure more than atmospheric pressure. Consequently there can be no steam pressure to "let out" by cracking the shell. Furthermore, the shell and shell membrane are not air-tight, for the chick in its development has to breathe, and the air for this purpose passes through the shell; so that even supposing the pressure were slightly above that of the atmosphere, it would soon be reduced by the escape of steam through the shell.

That Cocoa is Made from Cocoanuts

The cocoanut palm (*Cocos nucifera*), as the name implies, belongs to the order *Palmaceæ*, which grows in the tropics, and supplies the prizes in the national game without which no seaside is complete. Etymologically it is better to spell the name coco-nut, which is not so misleading as cocoa-nut. The large cocoanut is contained within a thick pericarp, or outer covering (rarely seen in England), which is very fibrous and affords "coir fibre" (same as cocoanut fibre) used for mats, brushes, &c. The hard shell (which is really the inner layer of the pericarp) is known as the endocarp.

"Cocoa is prepared from the seeds of *Theobroma cocoa*, which belongs to the order *Byttneriaceæ*, and is grown in Trinidad, the northern provinces of South America, and Brazil. The seeds, closely packed, are contained in a pericarp 4 to 6 inches long and 2 or 3 inches in diameter. They are dried, roasted, and ground to form cocoa. Finely ground, made up into paste, and flavoured, they form

chocolate. In 1890 nearly 28 millions of pounds of cocoa were imported into Great Britain, upwards of 20 millions being entered for home use."—Prof. Daniel Oliver, F.R.S.

Hence we see cocoa is a corruption of cacao, the name of the tree, and cocoa-nut is a corruption of coco-nut, through a mistaken connection.

That Fish Contains Certain Elements which adapt it in an especial manner to Renovate the Brain, and to Support Mental Labour

"I may here advert to a belief which appears to be widely entertained, viz. that fish contains certain elements which adapt it in especial manner to renovate the brain and to support mental labour. There is no foundation whatever for this view. The value of fish to the brain-worker is due simply to the facts already referred to, viz. that it contains, in smaller proportion than meat, those materials which, taken abundantly, demand much physical labour for their complete consumption, and which without this produce an unhealthy condition of body more or less incompatible with the easy and active exercise of the functions of the brain."—Sir Henry Thompson, F.R.C.S., M.B., &c., "Food and Feeding."

That it is the Best Practice to Employ Nothing in our Diet but Matter which has Nutritive Value; and therefore that the Husk of Wheat Should be Removed before it is Ground into Flour

On this subject Sir Henry Thompson, F.R.C.S., M.B. Lond., remarks: "No portion of the husk of the grain should be removed from the wheat when ground, whether coarsely or finely, into meal. That a partial removal is systematically advocated by some as an improvement is one of the numerous illustrations of the modern and almost universal craze which just now exists among food purveyors of almost every description for eliminating all inert or innutritious matter from the food we eat. This extraordinary care to employ nothing in our diet but matter which has nutritive value—that is, can be absorbed into the system—is founded upon want of elementary knowledge of the first principles of digestion; and yet, strange to say, the mistaken, indeed mischievous, practice is supported, probably for want of thought, by many who ought to know better.

"It seems now to be overlooked that no proper action

of the intestines can take place unless a very considerable quantity of inert matter is present in our daily food, existing as material which cannot be digested. By this character we are not to suppose that it is in the least degree 'indigestible' in the sense of that term when employed to signify 'difficult digestion,' but only that it passes unchanged through the body, neither receiving nor exciting any action. When there is a considerable portion of this in the food, the bowels can act daily and regularly, having a mass which they can transmit. When, on the other hand, the food is so 'nutritious' as to be almost entirely absorbed, there is very little solid matter to transmit, and the action of the bowels is infrequent, irregular, and unsatisfactory. This is, in fact, very extensively recognisable of a great deal of the habitual constipation so prevalent among the middle classes at the present time."

That Salt Water Mussels are Poisonous at Certain Seasons

Dr. Charles Warden says: "To some constitutions (gouty, for instance) mussels are always poisonous—at any rate, may prove so injurious that they may be denominated poisonous."

Dr. Percy Frankland, F.R.S., on page 132 of "Our Secret Friends and Foes," says: "Brieger has isolated a very poisonous substance from decomposing mussels, and other poisonous materials have been separated from decomposing cheese." Besides, there are a number of cases on record where pork, fish, and other flesh have poisoned several people at a time. Hence we conclude that it is not the time of the year that makes mussels poisonous, but that it is the delay from the time when they die to when they are eaten, which may be long enough for the poison to be formed, that causes the trouble.

That the Colour of Green Tea is Produced by Drying the Leaves on Copper Trays

Mr. Ball, in "Cultivation and Manufacture of Tea," says: "The leaves of green tea are roasted also in an iron vessel, but as soon as gathered, without any previous manipulation, all heating or fermentation of the leaves being studiously avoided; they are then rolled as black tea, and finally dried in the same vessel in which they have been roasted, by constantly stirring and moving them about.

They are also fanned to hasten evaporation, and the drying and formation of the peculiar characteristic colour of this tea, which it gradually acquires in this process, and which resembles the bloom on some fruits."

"The colour of Chinese green tea," says Mr. James Paton in the "Encyclopædia Britannica," "is entirely due to the rapid drying of the fresh leaves, which prevents the chlorophyll from undergoing any alteration.

"The green tea sent out from China is almost invariably faced or glazed with artificial colouring matter, particularly with a powdered mixture of gypsum (calcium sulphate) and Prussian blue (ferrocyanide of iron). Indian green tea never owes any of its colour to 'facing' with foreign substances."

That the Dangerous Qualities of Bad Water are Obviated by the Addition of Wine or Spirits

This is one of the dangerous fallacies, for it might easily get its believers into trouble. The late Sir Henry Thompson, F.R.C.S., to whom the author is greatly indebted for his special permission for these quotations to be made, said on this important subject: "The only water safe for the Continental traveller to drink is a natural mineral water, and such is now always procurable throughout Europe, except in very remote or unfrequented places. In the latter circumstances no admixture of wine or spirit counteracts the poison in tainted water and makes it safe to drink, as people often delight to believe, but the simple process of boiling renders it perfectly harmless." A memorandum issued by the Local Government Board states: "It cannot be too distinctly understood that the dangerous qualities of bad water are not obviated by the addition of wine or spirits" (Art. 7).

That an Egg that has been Soft-boiled and allowed to get Cold cannot be Hard-boiled by Re-boiling

"We have seen the above in print, therefore," some say, "it must be true!" But it is not. We have consulted many about it, and it appears to be a fairly common fallacy. One individual who had not heard of it made up for this deficiency by saying that she had heard that a hard-boiled egg could be softened by re-boiling! Well, we live and learn—or at least some of us try to.

Now for some facts. Two new-laid eggs were boiled for 2½ minutes, the water boiling when they were put in. On being taken out one was opened at once and found to be just nicely soft-boiled, so nicely, in fact, that it was at once eaten! The other was kept five hours, by which time it was quite cold, and then put into boiling water and boiled for 20 minutes; it was then taken out, cut in two, and found to be decidedly hard. It was pointed out to the author, however, that the "control experiment" (*i.e.* the first egg) was not quite satisfactory, for had it not been opened and eaten it might have become hard by the time it was cold; so that we could not be certain that the second egg really was soft when it was started on its second boiling. Hence we boiled two more eggs for 2½ minutes. They were both left for 18 hours, and then one was opened. This was not quite done, that is to say, the white next to the yolk was not quite set. Hence this experiment was not considered satisfactory, though we boiled the second egg a second time for 15 minutes and then found it was quite hard. In the third and last experiment we boiled two eggs for 3 minutes, left them for 25 hours, opened one, found it just nicely cooked, boiled the other 15 minutes, and then found it quite hard. This we considered entirely satisfactory, and in future, fair housewife, you will be able to hard-boil for salad all cold soft-boiled eggs that happen to be left from breakfast, though there is no reason why a cold soft-boiled egg should not be boiled for 2 to 2½ minutes to warm it without hard-boiling it.

That if Water contain a Large Number of Bacteria of any kind it is necessarily Unfit to Drink

Dr. Percy Frankland, F.R.S., when speaking at the Institute of Civil Engineers some years ago, mentioned this error. After pointing out that there are numbers of bacteria which are quite harmless to man, nay, which are most useful to man, for they attack the bacteria which are harmful to him, he gave as an example the case of a vessel of water which on a certain day was as pure and fit for drinking as it was possible to have it, though containing a few of these friendly bacteria. Now, letting this stand for a few days in such a manner as for it to be impossible to become contaminated in any way, the number of these

friendly bacteria would increase enormously, and yet, he remarked, the water could not be said to be in the least less fit for drinking than it was in the first instance.

As a proof that the presence of bacteria is not synonymous with death to us, we may mention that numbers of the bacillus Coli Communis are normally present in the human intestines. We may go still further and say that we probably could not live if the whole of our bodies were perfectly sterilized.

That Sugar is Made from Bullock's Blood

The origin of this fallacy is clear. In the process of manufacture the solution of brown sugar is passed through animal charcoal to de-colour it, and the animal charcoal is made from bullock's blood. There are at least two reasons why the fastidious should be appeased, one, because they do not mind eating the bullock's flesh which has yielded the blood; and two, because to carbonise the blood great heat is required, and thus all forms of life, bacterial or otherwise, are killed.

An admirable illustration of the danger due to some popular fallacies has occurred in connection with the present unrest in parts of India. Commenting on this in the leading article of Sept. 10th, 1906, the *Daily Mail* said: "A speech delivered at Asansol, after Mr. Banerjee's 'coronation,' repeats all the falsehoods which fired Indian disloyalty on the eve of the Mutiny in an insidious form. The Mahommedans are told that the British *are refining sugar with pig's blood,* while the Hindus are warned that *cow's blood is being used,* the suggested object in either case being to cause defilement. The resemblance with the stories circulated on the eve of the Mutiny, that cartridges for the new rifle were prepared with pig's fat, is exact and disconcerting, and the aim of the men who are spreading these tales is the same."

That it is Bad to Begin a Dinner with Soup because it Dilutes the Gastric Juice

Soup is food which is nearly digested, so that very little is left for the digestive organs to do. It is, therefore, rapidly absorbed and refreshes the system in a few minutes, making the diner feel more fit to go on with the rest of the meal. See "Food and Feeding," 8th edition, by Sir Henry Thompson, F.R.C.S., p. 146.

That it is a Good Thing to Take a Glass of Sherry Before Starting Dinner

Sir Henry Thompson, F.R.C.S. ("Food and Feeding"), says (p. 146) this is "a gastronomic no less than a physiological blunder, since it overstimulates and tends to injure an empty stomach, while it depraves the palate," while on p. 166 he says: "After all, those who drink water with dinner probably enjoy the pleasure of eating more than those who drink wine. They have generally better appetites and digestion, and they certainly preserve an appreciative palate longer than the wine-drinker."

Nowadays, when total abstinence receives such strong support from the great and able men of all callings—the Lord Chief Justice Alveston, the Chief Justice of the Divorce Court, Lords Roberts and Kitchener, Sir Victor Horsley, F.R.C.S., &c.—it is not difficult to obtain decided opinions from those most qualified to speak, but for all this we should like to conclude with yet one more quotation from Sir Henry (p. 160): "I am of opinion that the habitual use of wine, beer, or spirits is a physiological error, say, for 19 persons out of twenty (=95 per cent.). In other words, the great majority of the human race, at any age or of either sex, will enjoy better health, both of body and mind, and will live longer, without any alcoholic drinks whatever, than with habitual indulgence in their use, even although such use be what is popularly understood as moderate."

That Hors-d'œuvres are Good Preliminaries to a Dinner

Sir Henry Thompson, F.R.C.S., to whom we are much indebted not only for his permission to quote from his well-known book, "Food and Feeding," but also for his kind assistance in answering several questions addressed to him, deals with this fallacy on pp. 148 and 149 of the book cited, and speaks in no uncertain tone against the practice.

That the Strasburg Geese are Roasted Alive in the Preparation of Pâté de foie gras

The process is so cruel that it needs no exaggeration. The goose is pinioned on to a board by having its wings and legs spread out and fastened to the board so that it cannot move. It is then placed before a fire to keep it warm, not to roast, and is forced to eat far more than

it requires, the food being barley meal. The result of this cruel forcing and want of exercise is to cause fatty degeneration of the liver, which enlarges so much as to nearly kill the bird. If there were no demand for *pâté de foie gras* none would be prepared, and this cruelty would cease; so that lovers of animals and others who do not approve of such cruelty can help to diminish it by not eating the product.

That Jelly Made from Gelatine is very Nutritious

Gelatine closely resembles albumin, glutin, and casein, which substances are decidedly nutritious, and hence the very natural mistake, especially when the chemical composition of gelatine is taken into account, for it contains about 18 per cent. of nitrogen, combined with 50 per cent. of carbon, 7 per cent. of hydrogen, 23 per cent. of oxygen, and small quantities of other substances. Its nutritive value —or rather its absence of such—has been tested by feeding animals entirely on it, with the result that they have died with all the symptoms of starvation. Volume for volume cream is far more nutritious than jelly.

Gelatine is obtained from bones, bone-dust, cartilage, &c., by boiling, and a very small quantity makes a lot of jelly, thus further diluting what little value it has as a food. Hence do not think that because you succeed in getting invalids to take jelly you need not trouble further about their taking sufficient nourishment.

That Asparagus is Unwholesome

If it be so, it is curious that Sir Henry Thompson, M.B., F.R.C.S., does not mention the fact, instead of which he says that cold boiled asparagus served with a mayonnaise forms a dish of its kind not to be surpassed, and that it is valuable on account of certain salts (asparagin) which it contains. He gives an excellent note as to how it should be cooked, so as to get more of the stalks tender, by cutting it all to one length and then standing it, stalks down, in a deep saucepan, with the tops standing 2 inches *out of* the water, so that they cook more slowly in the steam.

The *Lancet*, in May, 1906, had the following note on the subject:—

"There are no doubt examples of persons who exhibit an idiosyncrasy towards asparagus and develop unpleasant

symptoms after eating it, just as there are people who are poisoned by mutton or strawberries, but on the whole there is nothing to be said on physiological grounds against moderate indulgence in this very popular vegetable food." We have consulted several standard books on hygiene, and have failed to find anything said against asparagus.

That Crimping, per se, Improves Salmon

The reason for the improvement appears to be due to the fact that crimping *kills* the fish, killed fish having a better flavour than that of fish which has been allowed to die of asphyxia. Dutch fishermen always kill their fish, and this has the double advantage of improving the flesh and being a more merciful method.

Some think that crimping is cruel, and will not eat crimped fish in consequence, but Sir Henry Thompson, F.R.C.S. ("Food and Feeding," p. 133), says it inflicts no pain whatever on the fish, and that were it otherwise he would not sanction it for any consideration whatever. The author wrote to Mr. John Colam, the Secretary of the Royal Society for the Prevention of Cruelty to Animals, on the subject, and he replied that "the crimping of salmon or cod is not, as has been supposed, horrible torture. The strength of these fishes is so great that it would be impossible to manipulate them if alive for the purpose of crimping. Consequently they are stunned with a heavy mallet in the first place, killed in the second place, and crimped in the third place. Even if the vertebral columns, as stated in your letter, were severed, the first severance would destroy all possibility of sensation."

That More Beer is Drunk, per Head, in Germany than in the United Kingdom

Germans and beer are inseparable in the English mind, but it turns out to be a case of what is vulgarly known as "pot calling the kettle black," for we drink very nearly 25 per cent. more beer per head than the Germans, the exact figures for the year 1899 being :—

31·9	gallons	per head	per year	in United Kingdom.
27·1	,,	,,	,,	Germany.
13·0	,,	,,	,,	United States.
5·5	,,	,,	,,	France.

For spirits the figures for the same year were :—

2·07	gallons	per	head per year in	France.
1·85	,,	,,	,,	Germany.
1·03	,,	,,	,,	United Kingdom.
0·92	,,	,,	,,	United States.

For wine :—

24·64	gallons	per	head per year in	France.
0·77	,,	,,	,,	Germany.
0·41	,,	,,	,,	United Kingdom.
0·23	,,	,,	,,	United States.

FALLACIES CONNECTED WITH OURSELVES

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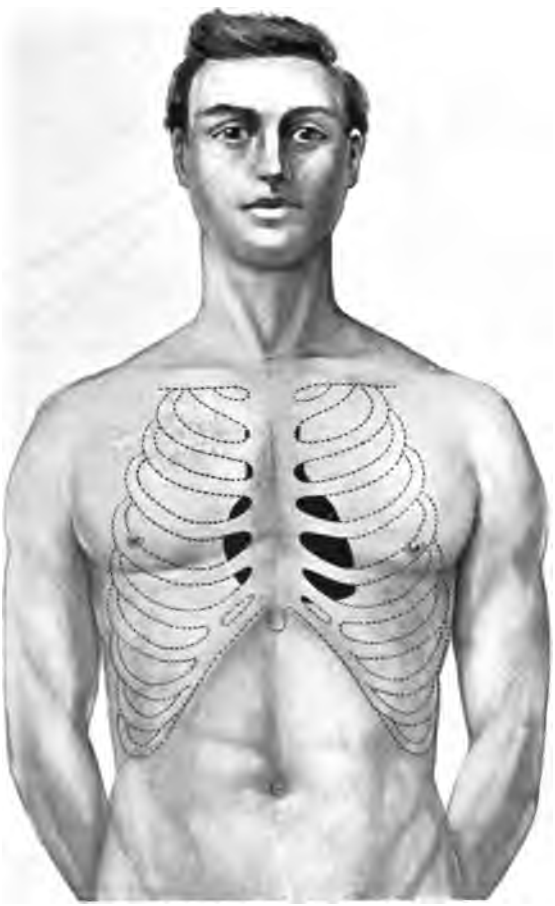


THE POSITION OF THE HUMAN HEART

FALLACIES CONNECTED WITH OURSELVES

(a) OUR BODIES

That a Man has One Rib Less than a Woman

THIS fallacy has no doubt arisen from the account of the Creation given in Gen. ii., 21 and 22, and those who state it are not clear as to whether it is on the right or left side that a man is one rib short. In the Natural History Museum, South Kensington, there are two normal skeletons (of a man and woman) side by side, and it will be found (much to the humiliation of the New Woman) that the man as well as the woman has twelve pairs of ribs.

A wag has said that though a man has the same number of ribs as a woman, he has less tongue!

It is not a fallacy that we are taller in the morning than in the evening, for the discs of cartilage between the vertebræ (24) of the backbone yield considerably to the pressure due to the weight of the body, when it is erect, and expand themselves while the body is in a recumbent position. This effect may amount to as much as half an inch in the case of a heavy man of, say, 5 ft. 10 in. in height.

That a Body Floats as Soon as the Gall Breaks

The cause of a body rising is not the breaking of the gall, the reason is that the body becomes less dense (or "lighter," as it would be popularly expressed) than the water, owing to the generation of gas within it as putrefaction proceeds.

Hence a body will float sooner in warm than in cold weather.

That the Human Heart is in the Left Side of the Thorax

The most muscular chamber, the left ventricle, of the heart is on the left side of the heart; the largest artery—the aorta—arches over to the left (to the right in birds and reptiles), and the point is directed towards the left; these facts make the beating of the heart more readily felt on the left side, but a median vertical plane through the breast-

bone would cut off the larger portion of the heart on the right side.

That a Man Does not Weigh More After Dinner than Before

This fallacy has probably arisen from the fact that a man after eating and drinking, say, 2 lb. of food, does not weigh quite 2 lb. more than he did just before beginning to eat. This is due to the body continually losing weight, whether one is eating or not, but far more when doing violent exercise, by perspiration through the skin, and by the moisture and carbon dioxide gas exhaled from the lungs.

The increase in weight is readily shown by good scales; and at the Constitutional and Automobile Clubs they have weighing machines and a book in which members can register their weights before and after meals. These records invariably show an increase as the result of eating. A member of the Constitutional Club kindly copied a few of these entries for the author, and these give 2¼ lb. as the mean increase due to dining; the mean weight of the men before dining being twelve stone.

A man whose mean weight was 12 lb. 12 oz. increased 1 lb. 13 oz. (mean of 4) through having had lunch, and the same individual increased 2 lb. 14 oz. when he had dinner.

If there is any reader still sceptical on the subject, we beg leave to refer him or her to Professor Huxley's "Lessons in Elementary Physiology," page 4; and the author may add that he has on several occasions weighed himself before and after a meal, and in all cases his weight increased. He has also weighed himself before and after a Turkish bath, and this showed a loss of 1¾ lb. on 12 stone 3 lb.

That a Ventriloquist Talks in his Stomach

The etymology of this word has a great deal to answer for, as it no doubt keeps the popular idea alive. Certain animals, to wit the lobster and crayfish, have teeth in their stomachs; but, as far as we know, they do not possess the power of producing audible sounds by means of that organ.

On this subject Professor Huxley, F.R.S., says:—"What is called *ventriloquism* (speaking from the belly), and is not uncommonly ascribed to a mysterious power of producing voice somewhere else than in the larynx, depends entirely upon the accuracy with which the performer can

simulate sounds of a particular character, and upon the skill with which he can suggest a belief in the existence of the causes of these sounds.

[To aid him in this he keeps his lips as motionless as possible, and employs lay figures, which are sometimes very life-like, and other suitable "properties."—Author.]

"Thus, if the ventriloquist desires to create the belief that a voice issues from the bowels of the earth, he imitates with great accuracy the tones of such a half-stifled voice, and suggests the existence of someone muttering it by directing his answers and gestures towards the ground. These gestures and tones are such as would be produced by a given cause; and no other cause being apparent, the mind of the bystander insensibly judges the suggested cause to exist."

That it is the Right Thing to Shut One Eye when Looking Through a Microscope or Telescope

Almost any book on the microscope will tell you this is wrong, for it is more tiring to the eyes, especially—as is usual with those who do it—if the fingers be pressed over the eye that is not in use.

We quote from Dr. F. O. Bower, F.R.S., in his small edition of "Practical Botany," page 14:—"Observers should accustom themselves to using both eyes indifferently, and when one eye is being used for observation, *the other should be kept open;* a little practice will soon overcome any difficulty which may be at first found in doing this." It *is* more awkward the first hour or two, when one has been in the habit of doing wrongly, but the comfort obtained when one has become used to the right method is well worth the effort. We may notice, too, that little children, who have never seen a microscope used before, naturally keep both eyes open. This is not the only thing which children do naturally the right or logical way, but owing to their being surrounded by so many illogical and inconsistent practices this valuable faculty is soon lost.

That Comparative Anatomy shows that the Human Teeth and Intestines are Constructed with a view to the Digestion of Flesh, and not Vegetables

Comparative anatomy establishes without a doubt the frugivorous, and not the carnivorous, origin of man.

"The natural food of man," says Cuvier, "judging from his structure, appears to consist principally of the fruits, roots, and other succulent parts of vegetables." This opinion is corroborated by that of Linnæus, Gassendi, Ray, and Owen; and Sir Henry Thompson, F.R.C.S., says in his "Food and Feeding," page 18: "Any evidence to be found by anatomical investigation can only be safely regarded as showing what man is and has been. Thus the characters of his teeth and digestive organs indicate that during his long history of development he has mainly lived on roots, seeds, nuts, and fruits; in other words, he has been a vegetable feeder."

The assertion so often made that alcohol and animals are "sent" us as food is absurd. The mere fact that we have been accustomed to eat flesh-food no more proves that animals were created for this purpose than the existence of cannibalism proves that missionaries are "sent" to the South Sea Islanders solely as an article of food, or the existence of slavery that black men are "sent" to be the slaves of the white.

That a Person Falling from a Great Height (say 200 feet) is Dead Before he Reaches the Bottom

If the above were not a fallacy, then the Irishman's statement that, "It is not the fall that hurts, but it is the *sudden stop*," would be incorrect.

There are many instances on record of people falling 50 feet and upwards with little or no ill-effect. We have it on the authority of a professional friend that about the year 1856 a boy fell down a pit (on one of the Great Western Railway Company's lines) some 250 feet deep and called out "Below" three times on his way down, though needless to say, the poor fellow, who so unselfishly thought of warning his mates to get out of the way, was killed. There is a case on record of a servant girl falling from Clifton Suspension Bridge in May, 1885, and not being killed; in fact, she is alive still. In this case, no doubt, her clothing acted as a kind of parachute; but still the maximum velocity attained must have been very great, for the fall was about 250 feet.

On September 18th, 1896, a man threw his two children, aged three and twelve, from the same bridge. A boat

was passing at the time, and the boatman saved the children, who were but slightly injured by their terrible fall. Their names were Elsie and Ruby Brown.

Then, again, we have the instances of professional divers (*e.g.* the man who used to perform at the Royal Aquarium), and acrobats, such as one of the Hanlon brothers, who used to dive from the roof of Olympia into a net below. Also Baldwin, the intrepid parachutist, though, of course, his downward career (no offence intended!) used to be checked by the parachute; but before this was fully open, the velocity must have been considerable.

Lastly, we have the case of a train travelling at 60 miles per hour (*i.e.* 88 feet per second); we presume no one believes that it would kill a person to put his or her head out of the carriage window when travelling at the above rate; and yet 88 feet per second is the maximum velocity one could attain in falling from a height of 120 feet.

In some cases of persons with weak hearts, it may have happened that the *shock* of feeling themselves falling has caused such a great increase in the pressure of the blood in the heart that it has ruptured that organ; for the shock causes all the muscles to contract violently, the muscles compress the blood-vessels, and thus the blood is driven towards the heart.

The idea seems to be that it is impossible to breathe while falling rapidly, and that the time taken in falling is longer than that for which we can do without breathing; but we could fall nearly 400 feet (Nelson's Column in Trafalgar Square, London, is only 106 ft. high) in five seconds, and we can hold our breath quite comfortably for 60 seconds!

The following notice appeared in the *Evening News*, of February 16th, 1897:—"Some coursing was taking place near the Dover Cliffs to-day when a rabbit jumped over, and two dogs followed. They fell 200 ft. on to the rocks below, and although the rabbit was killed the dogs were found running about very little the worse for their desperate leap."

Two other notices that have appeared in the Press are:—

From the *Daily Chronicle*, of September 11th, 1897:—"A remarkable escape from a terrible death occurred near Dover yesterday, when a lad about fifteen years of age fell over Abbott's cliff, which is 415 ft. high. A lady and

gentleman, visitors, were walking along the cliffs towards Folkestone with their son, when they suddenly missed him, and it became apparent that he had fallen over the cliff. Assistance was ultimately obtained from the coastguard station at Lydden Spout, and a search party mustered. The boy was found on a ledge of loose earth which had arrested his fall in the most remarkable way about half-way down the cliff, and was rescued by coastguard Doolin, who was lowered down the face of the cliff by means of ropes. Except a severe shock and a few bruises the boy escaped serious injury. The cliffs are very dangerous near the edge, and in many places overhang, so that the weight of a person is almost sufficient to dislodge the soil. Between Folkestone and St. Margaret's Bay the cliffs are much used by visitors, most of whom are not aware of the dangerous nature of the ground they walk upon."

And from the *Daily Mail*, of December 22nd, 1898:—"A peculiar fact was stated at an inquest held on William Glynn, a tailor, and private in the 16th Middlesex Volunteers, who committed suicide by jumping over London Bridge, and whose body was subsequently picked out of the river at Hammersmith.

"Dr. Barnes, who had made a post-mortem examination, said there were none of the ordinary signs of drowning, but that death was due to failure of the heart's action and shock from *falling* from a height. In his opinion the man was dead before he reached the water."

It will be noticed that in the last case death was due to heart failure, and not to asphyxia.

That it is Better for us to have the so-called "Children's Ailments" (Measles, Whooping-cough, Chicken-pox, Scarlet Fever, &c.) when we are Children than for us not to have them at all in life

It is a most common thing to hear a mother make some such statement as the above, and as she believes it to be true, she takes little or no precaution to prevent her children going where they are likely to become infected with these maladies. Personally, the author is very grateful to his parents for the care they took in the matter, as the result of which he was doubtless saved from all but the first-mentioned complaint in the above list, and that when he

was 17 years old, and therefore less likely to be harmed by it.

To our question on the subject, Dr. J. Cooper Torry, M.R.C.P., replied: "Better not have the diseases at all"; and Dr. Charles Warden: "Certainly not; these disorders are great evils, but not necessary evils."

Dr. George Reid, D.P.H., goes into this question very carefully in his "Practical Sanitation" (3rd ed., 1895), pp. 190-192, to which we refer the reader for full particulars, though we give his most important conclusions below:—

"The common practice of exposing children to infection, on the pretext that the ailment, whatever it may be, is mild in its nature, and that, sooner or later, they will contract the disease in any case, is greatly to be condemned. One especially hears this argument used during outbreaks of measles, whooping-cough, and scarlatina. It is, however, highly fallacious, for the following reasons:—

(1) A mild case may give rise to a serious one.
(2) It by no means follows that all should suffer during some period of their existence.
(3) One attack does not necessarily afford protection from a second.
(4) The fatality in children is nearly always greater than in adults.
(5) The liability to attack diminishes with age.

"Sixty per cent. of the deaths from measles occur during the first two years of life, 75 per cent. during the first three, and over 90 per cent. occur among children under five years; while of the fatal cases of whooping-cough, 40 per cent. occur under one year, 75 per cent. under two years, and 96 per cent. under five years.

"Enough has been said to show the risks that children run through careless exposure to infection, and the facts cannot be too forcibly brought home to those whose duty it is to protect them.

"Sometimes one does meet with thoughtful and intelligent parents."

That a Man has Seven Skins, and that Prince Leopold and the Duke of Clarence had only Five Skins Each!

A much enlarged section through human skin is usually given in works on human physiology. Such an illustration

accompanies our letterpress. From this representation in section it is seen that while the structure of skin is not the same throughout its whole thickness, it is certainly not divided up into distinct layers. Physiologists recognise at most two layers, which, together, make up the skin. This is a different thing from saying there are two skins. The outer of these layers is called the epidermis, which is comparatively dry and senseless, and acts as a protection for the inner layer, the dermis, or true skin as it is sometimes called.

That if a Man has a Tendency to become Bald he should shave off his Beard, as the latter abstracts some of the Nourishment from the Hair of the Head

Dr. Gustav Jaeger refers to this fallacy on page 41 of "Health Culture" (1897 edition). We have consulted Quain's "Diotionary of Medicine" (1902 edition), and can find no support there for the belief, though the subjects of hair and baldness are pretty fully dealt with.

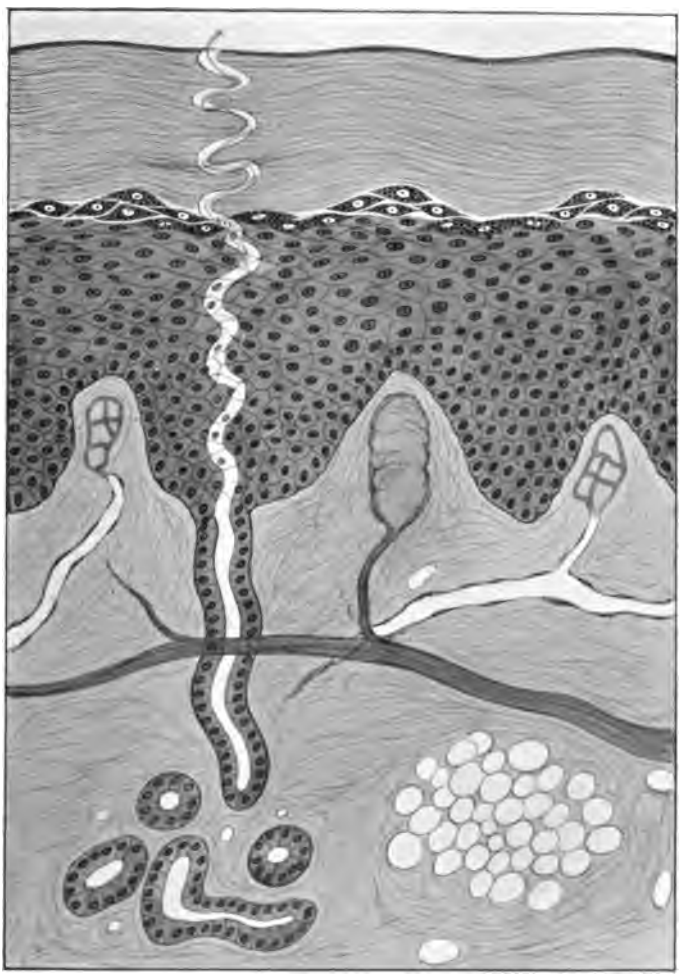
That a Drowning Person always Rises to the Surface Three Times Before Finally Sinking

Dr. H. D. Littlejohn deals with the subject of drowning in the "Ency. Brit.," and we have abstracted the following from his long article :—

"The drowning individual struggles to reach the surface of the water in his efforts to respire; and as he does so he draws water into his windpipe which provokes coughing. This expels the air from his lungs, and the water which threatened to suffocate him; and as he sinks, in his struggles he endeavours again to respire, but now draws water into his mouth which chokes him, and which can only be got rid of by swallowing. Insensibility then comes on, and death rapidly but placidly ensues from a true asphyxia."

There is not a word in the quotation or the whole article which says or implies that the unfortunate person ever rises three times before dying.

On referring to Quain's "Dictionary of Medicine," we find the article "Death by Drowning" is by Prof. J. Dixon Mann, M.D., F.R.C.P., and in it he says :—"The specific gravity of the human body is slightly greater than that of water, so that an individual who falls into deep water tends to sink. The involuntary movements of the limbs, made in attempts at self-rescue, are sufficient, however, to bring



SECTION OF THE HUMAN SKIN.

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the body, at least momentarily, to the surface, when air along with water is forcibly drawn into the lungs. Sooner or later, according to the strength and natatory power of the victim, the body is again submerged. In fatal cases *this alternation may be repeated several times before the body finally sinks.*" The italics are ours. Here, though the rising and falling are specifically referred to, there is no suggestion that the phenomenon occurs exactly three times, no more and no fewer.

The first sentence of this quotation seems to need explanation. By "human body," we understand the naked human body in its normal condition, *i.e.* with a certain quantity of air in the lungs, air-passages, and other parts. In this condition we maintain that the specific gravity of the naked human body is *just less than* that of fresh water, and consequently still less than that of sea-water, and that this is so is easily demonstrated in a freshwater swimming-bath, or at the seaside, by those who can float "without moving a hair," as the expression is, *i.e.* by lying straight out with the arms above the head and in line with the rest of the body and legs, and the head well in the water. This may be done either on the back or on the abdomen; but, of course, in the latter case the experimenter cannot breathe! When this floating is done on the back in sea-water, the face and upper part of the chest remain out of the water, and it is quite easy to breathe when the water is smooth; but when only slightly rough, the little waves have an unpleasant trick of just washing over one's face and into the nostrils.

The author has not tried this method of floating when fully attired; but, in all probability in that case, especially owing to the weight of boots and coins and other things in pockets, the specific gravity of the whole would be greater than that of water, and hence the body would sink.

When we consider the dangers that people who cannot swim are to themselves *and to others*, who frequently have to risk their lives in saving or attempting to save them from drowning, it is a wonder and a pity that there is not compulsory teaching of swimming, just as there is compulsory education in other subjects.

Contrary to the ideas of many non-swimmers, the rescuing of a drowning person is a very arduous and dangerous

operation, and only likely to be successful when undertaken by cool-headed and powerful swimmers.

That a Caul Prevents its Possessor from being Drowned

This is one of the ultra preposterous fallacies which might have been omitted with numbers of the same family which we have omitted, but it is still so popular, and advertisements offering to sell cauls have appeared so recently in the daily Press, that we decided to include it.

Although, apparently, a caul is now supposed only to prevent drowning, it was comparatively recently supposed to betoken great prosperity for the person born with it, as well as to be able to impart the gift of eloquence. Ben Jonson says in the "Alchemist" (1610), Act I., Scene I.: "You were born with a caul on your head"; and it is referred to on page 7 of "Choice Notes from Notes and Queries," published 1859.

The *Daily Mail* of January 19th, 1899, had the following quotation from *The Lancet*:—"We believe that there is still some market for cauls among sailors, who retain their belief in the efficacy of the membranes as a protection against shipwreck and drowning. Notices of 'Cauls for sale within' were to be seen recently in windows in the vicinity of the docks both of London and Liverpool, but it is some time since we have noticed an advertisement of a caul for sale in the daily Press. It may be remarked that the sale of cauls so far from being a very ancient custom is a comparatively modern innovation. The witchcraft of the Middle Ages declared against the caul retaining any virtue whatever if parted with by gift or sale to any but a member of the child's kindred."

The writer regrets to record that he has an aunt by marriage who always carries a caul with her when she travels abroad.

In the *Daily Express* of August 23rd, 1904, there was this advertisement:—"Child's Caul for sale (male); £3. Apply 1, New Street, Lymington, Hants."

The author duly applied, and inquired the use of the said caul, receiving the following reply dated August 29th, 1904:—"Dear Sir or Madam,—I advertised the caul for sale as it is supposed if a person goes to sea and wears it, they never get drowned. They are very rare, and, as a rule,

captains, sailors, or anyone will give a good price to get one. I was offered £5 for it, and then I thought I should like to keep it, but I am in need of money, and advertised it for £3. I have been in correspondence with a gentleman, but I have had no definite answer. If you care to have it, it is at your disposal. Yours truly, ———

"P.S.—It was born with a boy twin, one being enveloped in it."

The author was pleased to note that the writer used the word "supposed," and evidently she did not believe the myth herself.

The following three advertisements all appeared in the *Star* on December 20th, 1895:—

(1) Caul (Male), £3, or offer. 44, Whitworth Road, Plumstead, Kent.

(2) Caul (Male); no reasonable offer refused; cash or kind. A. Kemp, Baggeholme Road, Lincoln.

(3) Child's Caul (Female) for sale; what offer? W., 2, Rutland Terrace, Tyne Estate, Ilford.

That it is Bad to Drink Water Directly after Eating Fruit

This idea used to be extremely popular at the Cape when the author was there some twenty years ago. He has inquired of a Wimpole Street physician (who was also formerly at the Cape), and cannot find that there is any truth in the belief, except the general one that it is not good to dilute the gastric juices too much after eating anything, and especially, of course, if the food be indigestible.

That Fruit is Leaden at Night

My Wimpole Street friend tells me fruit, *per se*, is not to be avoided at night, any more than any other article of diet which is easily digestible. Any food taken at night should be easily digestible.

That it is Bad for an Infant's Nails to be Cut, and that they should be Bitten instead

That this is not an extinct notion is illustrated by the fact that an experienced maternity nurse, holding the Q.C.H. and L.O.S. certificates, announced the principle to the author's wife on August 4th, 1906. The only explanation as to how the idea arose appears to be the following:—It is a fact that

infants are sometimes born with incomplete nails. Their anomalous appearance under such circumstances suggested a different process of shortening from that usually employed. It is also possible that the aid of the saliva, which, in popular belief is erroneously supposed to have particular healing qualities, is here invoked.

That it is a Bad Sign for a Child to be Born with a Tooth already Cut

Here the uncommonness of this event has struck the popular observation, and has been taken as unhealthy because it is unusual. Children who are born with teeth have usually been carried for a longer period than is normal, and, as a consequence, are delivered with difficulty. Hence, the tooth may be considered to indicate a past event, but not a future one.

That an Eight Months' Child Never Lives, though a Seven Months' One often does

A consulting physician of one of the children's hospitals in London tells the author that both eight and seven months' children are below the normal time, but that the probability of survival is in favour of the eight months' child.

The author, too, can find nothing in support of the usual statement in Dr. Pye Chevasse's well-known work.

That Children should be Lightly Clothed, with their Limbs Bare, so that they may become "hardened"

E. S. Reynolds, M.D. Lond., F.R.C.P., in his "Hygiene for Beginners," says: "The practice based on this idea is a great mistake, and little short of cruelty. They should be covered almost entirely with a layer of fine woollen material, and the outer garments should be warm and light." Another physician says that, of course, a robust child may stand exposure which would kill a weakling. The Zulus make use of this method of sorting out the strong from the weak, for their new-born babes are plunged into cold water, and the weaklings are thus killed. Cruel as this treatment appears in our eyes (it must not be forgotten that African water is not quite so cold as water in England in mid-winter), it certainly has assisted to produce one of the finest races in the world from a physical point of view.

That Red Flannel is Warmer than White Flannel when Worn Next to the Skin

This fallacy has evidently arisen on the doctrine of association—fire is hot and red, so is red-hot iron ; snow and ice are white and cold—hence the tendency is to think all red things are warm, and all white ones are cool. This is illustrated by the fact that we speak of "warm colours" (dark ones with a mixture of red) and "cold colours" (light colours, especially slate and stone colours). No doubt a further reason for the belief that white is necessarily cold, is the fact that in summer and hot climates, much white (exterior) clothing is worn. The reason for this is that white reflects the heat and light rays better than other colours. In the case of *under*-clothing this effect could not take place.

An objection to coloured underclothing is that the dye may come off, and give rise to some skin trouble.

(b) OUR SENSES

That Woollen Articles and Metallic Articles which have been in the Same Room for an Hour, say, are not of the same Temperature

In the summer, when there is no fire in the grate, a good experiment in this connection is to feel the hearth-rug and then the fire-irons. Most people will declare the latter to be at a lower temperature. In the winter a silver sugar basin and a woollen tablecloth will serve the same purpose.

Undoubtedly the metal *feels* colder, but this only shows how deceptive our senses are if we trust to only one of them at a time; for if a thermometer be left in contact for some time, first with the metallic article and then with the woollen, it will be found to register the same temperature in each case.

Metal is a good conductor of heat, and when we touch a metallic object (at a temperature of 50° F., say) with our hand—which is at a temperature of about 98° F.—the metal rapidly conducts heat away from the hand, and we say the object is cold; but if we place our hand on a woollen shawl, which is at the same temperature as the metal (*i.e.* 50° F.), the wool, being a bad conductor of heat, does *not* conduct heat from our hand so rapidly, and we say the shawl is warm.

On the other hand, suppose the woollen and metallic

articles to have been exposed for some time to a higher temperature than that of the hand, say to 130° F. They will then both be at this temperature, but on touching the metallic article with the fingers it will feel uncomfortably hot, whereas the woollen one can be handled with ease. Hence, judging only by the sense of touch, we come to an opposite conclusion to what we did in the first place, and *now* say the metallic article is at the higher temperature. In this second case, the metal being a good conductor, *rapidly* parts with some of its heat to the hand, which is at a lower temperature; for when a cold body and hot body are in contact the temperature of the former rises and that of the latter falls, till they are both of the same temperature, if left in contact long enough. But when the woollen article is handled it only gives up its heat to the hand *slowly*, and thus causes no pain.

Now for a simple, though somewhat rough, test which can easily be made by anyone.

Take two small pieces of ice, or lumps of snow, as nearly the same size as possible, and place one piece on each article. Then in the first case (both articles at 50° F.) the person who said the woollen article was the warmer would expect the ice on it to melt faster than that on the metallic article, but it does not.

Of course, also in the second case (articles at 130° F.) the ice on the metal melts more quickly than that on the wool.

In winter if one sheet be of linen, the other of cotton, the former feels colder than the latter, though they have been in close contact for some time and must be at the same temperature. Here again the linen is a better conductor of heat than the cotton.

If blankets had an innate property of keeping at a higher temperature than the surrounding air, it is quite certain they would not be used to cover up the blocks of ice in the ice-vans which are seen about during the summer. Being bad conductors of heat, they prevent, to a large extent, the warmth of the summer air reaching the ice.

As a further experiment to prove the unreliability of the sense of temperature, take three bowls of water. Into the middle one put water at, say, 60° F. Into the right-hand one put water at about 105° F., and into the left-hand one water about 35° F. Now place the left hand in the left-

hand bowl of water and the right hand in the right-hand one, and keep them there for say a minute. Then plunge both into the middle bowl. What is the result? Why, to the left hand the water feels warm, and to the right it feels cool, though obviously it is all at the same temperature.

Boyle said: "The account upon which we judge a body to be cold seems to be that we feel its particles less vehemently agitated than those of our fingers or other parts of the organs of touching; and consequently, if the temperature of that organ be changed, the object will appear more or less cold to us, though itself continue of one and the same temperature."

That a Pound of Feathers is Lighter than a Pound of Lead (both being Weighed in Air)

This idea is due to two things: (*a*) when thinking of the problem we are inclined to think of the handful of lead that would weigh 1 lb., and a handful of feathers, which would certainly not weigh 1 lb.; (*b*) if the pound of lead be in the form of a ball, and the feathers be done up in a bag, then on placing the lead in the palm of the hand it only touches on a small area and the intensity of pressure is great, but the bag of feathers would more than suffice to cover the whole palm, and the intensity of pressure would be less, though the weight, or total pressure, is the same in each case.

Lastly, if one pound of lead and one pound of feathers were weighed in a vacuum, then on again weighing them in air, the feathers would appear the lighter, because they are less dense than the lead, and therefore displace more air weight for weight. Conversely, if they were first weighed in air and then weighed in a vacuum, the feathers would appear the heavier.

That a Solid Body—"a Thunderbolt," Comes Down and Buries itself in the Earth when there is a Lightning-flash

"The term thunderbolt, which is nowadays rarely used except by poets (and by penny-a-liners), preserves the old notion that something solid and intensely hot passed along the track of a lightning flash and buried itself in the ground. Two distinct classes of phenomena probably gave rise to this notion. When lightning strikes the ground it bores a hole of considerable depth, which is found to be lined with vitrified sand. This presents no difficulty. But

aerolites (meteorites) are often found, in the holes which they have made, still intensely hot, in consequence of their rapid passage through the air.

"A hasty generalisation seems to have connected these two entirely independent phenomena, and thus gave rise to the notion of thunderbolts."—Prof. P. G. Tait, M.A., D.Sc., F.R.S., in the "Encyclopædia Britannica."

"In gravel pits are found flinty stones, which are generally known by the name of thunderbolts, and are believed by many to come from the clouds; they are, however, petrified casts of the interior of the shells of several species of *Echinus* (sea-egg, sea-hedgehog, or sea-urchin), the petrifying matter having occupied the place of the animal, while the chalky shell has perished by the action of air, or by violence. When the animal is living, the outer part of its covering is furnished with numerous spines, which enable the creature to roll itself along at the bottom of the water; from this arises its name of the sea-hedgehog."—J. Timbs, "Popular Errors."

That Falling Stars are Actual Stars Falling, as their Name implies

This fallacy has arisen from the not uncommon practice of relying on one's own judgment concerning matters of which we know nothing, or next to nothing. Certainly as far as *appearances* go, a star does seem suddenly to take it into its head to rush off at a mad pace, and to the eye the distances from the earth of the real stars and the "falling star," appear to be the same, whereas in reality the actual stars are many millions of times farther off than the "falling star." But then a drunken man says he is sober, and a madman that he is king, these being merely degrees of misjudgment due to physical imperfections (temporary or permanent)—"We are none of us perfect, no, not one."

An evening spent at Messrs. Maskelyne and Devant's ought to convince the most confident how easy it is to deceive the senses, especially if they are dealt with singly.

Well, to come to our subject, "falling stars," or meteors, are caused by masses of solid matter, which may once have formed part of some planet, moving at a velocity of about 30 miles per second at a distance of 40 to 80 miles from the surface of the earth. At a distance of 80 miles from

the earth's surface the atmosphere is very attenuated, but the friction of it is sufficient—owing to the enormous velocity of the body—to cause the matter to become incandescent and to burn, hence when a portion of the body (called a meteorite) does reach the earth it is only a fraction of the mass that first entered our atmosphere, the rest having been oxidised and volatilised by the extremely high temperature.

Thus a meteor, or so-called "falling star," is the phenomenon of a meteorite (aërolite) moving at such a speed through the atmosphere as to cause it to incandesce.

"The term meteor is more particularly applied to the largest phenomena of this description, those next in size are called 'fire balls,' and the smallest, 'shooting stars,' though this last is a misleading term. The comets are well-nigh a millionfold, and even the moon is a thousandfold more distant from us than these meteors."—H. A. Nicholson, M.A., D.Sc., in the "Encyclopædia Britannica."

That Lightning Describes a *Zigzag* Path, thus

This error* should not need much refuting now that there are so many excellent photographs of lightning to be seen. For those who do not happen to have seen one of these photographs, we may mention that the appearance of lightning closely resembles a river and its tributaries, as represented on an ordinary atlas.

The artists P. Nasmyth and J. M. W. Turner used to represent lightning correctly, though they had not the assistance of the fine photographs that modern artists have, and yet, strange to say, these latter-day saints do *not* make

* See also p. 257.

the use of them they might do; and the author knows of one case in particular where a London professor of art has recently painted a fine large oil painting, in which there occurs a very finely developed "zigzag," and which looks for all the world as if it had been copied from that to be seen at Messrs. Maskelyne and Devant's, they, apparently, having bought theirs at so much a yard!*

There is at least one electrical paper in London which (most praiseworthily) always makes a stand for precise language and scientific accuracy. Its former title was "Lightning," and the seal or stamp on the flaps of the editorial envelopes had two streaks of lightning, each with a very bad attack of the acute zigzag complaint.

In concluding this article we may mention another fallacy in connection with lightning, viz. that lightning conductors attract lightning, and hence may actually be sources of danger. This fallacy was described as "a mischievous and baseless delusion" by Sir William H. Preece, F.R.S., in his presidential address to the Institute of Civil Engineers on November 1st, 1898.

That One Sniff of Chloroform will Render a Person Unconscious

We believe the villain in the "penny dreadfuls" and caravan theatres flicks a handkerchief moistened with chloroform in the face of his victim, whereupon she immediately proceeds to do a stage-drop.

When chloroform is used as an anæsthetic, one of the methods is to put it on a handkerchief and then hold this over the nose and mouth of the patient, so that he may inhale the vapour. The time taken to produce insensibility depends upon the constitution and condition of the patient, and is usually some few minutes.

That there is any Connection between Lunatics and the Moon

That there was such a connection was believed by the ancient Greeks. The term "lunatic" is derived from the Latin word "luna," the moon, and we find corresponding words in French, Spanish, and Portuguese-Italian similarly derived. The derivation thus embodies the old belief that persons mentally afflicted were affected by the changes of

* There is a very good article on lightning in the *Strand Magazine* for January, 1897, and one on lightning conductors in the *World's Work* for July, 1906.

the moon. The word is seldom employed in medical literature, but in its common use it appears to be more particularly applied to those who become periodically insane, *i.e.* those who have lucid intervals. It is interesting to notice that the Greek word "seleniakos," derived from "selene," the moon, meant epileptic, or moon-struck, crazy.

In conclusion the author has found on other and personal inquiry that this belief has no scientific foundation at all.

Another notion connected with the moon is that it is dangerous to sleep with the moon shining on one. This appears to have as little foundation in fact as the other idea.

(c) OUR DISEASES

That Tomatoes Induce Cancer

Once, when there happened to be an increase in the consumption of tomatoes, it was noticed that there was also an increase in the number of cancer patients, and some illogical people must have associated the two, and said that the one was the cause of the other.

No doubt, if we tried, we might find some other data of that period; such as that the number of things "made in Germany" was greater then than it had been before, and then we might equally illogically say, "therefore eating tomatoes makes things in Germany!"

However, on inquiring at the Cancer Hospital, Brompton, we were informed that there is no justification for it, and that the patients are regularly supplied with that vegetable when it is in season.

Dr. Gordon Stables, R.N., dealt with this fallacy in the *Yorkshire Weekly Post*, of Saturday, November 21st, 1896, as follows:—

"Cancer is one of the most terrible diseases that medical science has any knowledge of. The very fear of cancer when a tumour has been formed on the tongue or elsewhere has even driven men crazy. Sad to say, it seems to be on the increase in an almost direct ratio to the diminution of cases of consumption. The reason I cannot give. Let me say, however, in answer to a correspondent, that *the eating of tomatoes has nothing whatever to do with the production of the disease.* The tomato, if just ripe, and not too ripe, is probably the most health-giving fruit in the kingdom.

It sweetens the blood, and I even recommend it in the case of sleeplessness. No tumour should be neglected, however small or however innocent-looking. But it should be shown to a qualified surgeon or physician."

That it is Dangerous to have Flowers in One's Bedroom at Night

There is a saying that "what is one man's poison is another man's food." This may be re-modelled to suit this case into "what is poison to the animal kingdom is food to the vegetable kingdom"; in other words, the carbon dioxide (same as carbonic acid gas and CO_2) which is given off by the respiratory organs of animals is absorbed (chiefly by the leaves) by plants. The green colouring matter of plants is called chlorophyll (*Gr. chloros*, green; *phyllon*, a leaf). Now this chlorophyll, under the action of sunlight (diffused or direct, but more particularly the latter), has the property of decomposing the carbon dioxide into its constituent parts, carbon (which is a solid) and oxygen (a gas). The plant retains the carbon, which so largely enters into the composition of wood, but gives off the oxygen, which is the vital element of the atmosphere from an animal point of view. Hence we see we can even reverse the re-modelled saying which we gave above, and state roughly that "what is poison to the vegetable kingdom is food to the animal kingdom," though it is not correct to say oxygen is *poison* to the vegetable kingdom, as we shall see later on.

With regard to the rate at which this action takes place, Prof. Thorpe, F.R.S., states that a square metre (about 10½ square feet) of leaf will decompose in sunlight a litre (about 1¾ pints) of carbon dioxide per hour, and the quantity of carbon dioxide in the atmosphere is usually about 4 volumes in 10,000 volumes.

Hence, so far as the above process is concerned, flowers with green leaves are distinctly beneficial in a room in the daylight.

Now, although it may appear strange, it nevertheless is a fact that a plant is at all times (that is, in the day or night, light or dark) "breathing" in the same sense as we breathe, that is, it is absorbing oxygen and giving off carbon dioxide; but in the daytime the reverse process, described above, is taking place *to a much greater degree*, and this is the reason why it used to be thought that the

plant did not breathe in the daytime. This breathing of the plant is a *slight* disadvantage to the air in the room, but it is so very slight, and an ordinary gas- or lamp-flame would produce carbon dioxide at a far greater rate than a good-sized oak tree!

Sometimes the water in which cut flowers are placed is not changed often enough, and the unpleasantness arising from this may get ascribed to the flowers themselves.

It would perhaps not be advisable to sleep in a room in which there was a cartload of poppies (from which opium is obtained) or other similar flowers, but this would be just as unadvisable in the daytime as in the night.

Dr. Alfred Russell, of St. Thomas's Hospital, London, kindly wrote to the author thus: "Flowers are not removed from the wards at night. In small rooms they frequently are, particularly heavily-scented flowers; not, I think, because of any really harmful effect, but mainly to free the atmosphere from their odour."

That the Immediate Shooting of a Dog that has Bitten a Person Prevents that Person having Hydrophobia

Only two cases are possible: either the dog has rabies, or he has *not*, at the time of biting the individual; for the case in which he has only just received the germs of the disease himself we include in the first case. Now if the dog is not suffering from rabies, no amount of biting will produce hydrophobia in the person bitten, though he may object to parting with bits of himself, especially if he be a thin-legged cyclist and the dog selects his calf as the morsel. Hence, let the dog live (but isolated from other dogs, and under such control as to prevent further outbreaks of playfulness), and thus demonstrate to the remaining portion of the cyclist that the dog was not mad (for if it had only just been inoculated when it bit him, rabies would have developed in from three to six weeks, that being its period of incubation). This will have a most beneficial mental effect upon him, whereas, had the dog been killed the patient would have been for ever left in doubt, and would have feared hydrophobia developing at any time. Again, if the dog does develop rabies, then the medical man in attendance will know how to treat his patient (who, of course, in this case must *not* be told of the dog's condition),

whereas had the animal been destroyed, he would have been in doubt as to what methods to adopt. Even if the dog be mad, and the bite is through some thick clothing, there is not much to fear, and if hydrophobia does not develop in from three to six weeks, you may be pretty sure you will not have it.

In addition to the above fallacy, we have been told that the right thing to do is to take some of the hair of the dog, directly it has been killed, and dress the wound with it! *Could* anything be more dangerous than this? Even if the dog were not mad, his hair is sure to be dirty in comparison with the scrupulous cleanliness that should be observed when dressing all wounds, and thus the patient's blood might be poisoned. On the other hand, if the dog were mad, in addition to the above fact, there would be the further danger of the hair having some of the dog's saliva on it, thus greatly enhancing the chance of infection.

With the explanation just given it must be unnecessary for us to point out that the mere fact of shooting the dog cannot prevent hydrophobia developing in the person bitten.

For a most interesting account of hydrophobia and rabies, and the results of the treatment at the Pasteur Institute in Paris, see "Our Secret Friends and Foes," by Dr. Percy Frankland. Other accounts, giving full details of the symptoms of hydrophobia or rabies, will be found in Quain's "Dictionary of Medicine," pp. 696 and 1384. Some more information will be found also under the fallacy that a mad dog *foams* at the mouth, and that he avoids water.

The *Echo*, of February 21st, 1898, reported the case of an applicant to Mr. D'Eyncourt at the North London Police Court, who wanted a dog killed because it had bitten her little girl. Mr. D'Eyncourt asked the woman if this was to prevent the child having hydrophobia, and she said, "Yes, sir." The magistrate then explained the mistaken idea.

That you cannot have Measles, Scarlet Fever, and other "Children's Ailments," More than Once

All diseases are now believed to be produced by micro-organisms, particular varieties of which have been definitely found to be the causes of typhoid fever, tuberculosis (consumption), diphtheria, cholera, influenza, and many others respectively. Now when any particular variety of micro-

organism is causing disease in our bodies, it feeds upon certain substances found there, and also produces a poisonous substance called toxine. Hence it often happens that after a man has had an attack of small-pox he no longer has in his body any of that particular food material that the micro-organism which produces small-pox requires. This result is called acquired immunity from infection, and lasts for years in the case of small-pox. The effect is similar in the cases of typhoid fever, scarlet fever, and measles, though there are numbers of cases in which individuals have had more than one attack of these disorders.

There is another and more generally accepted theory of acquired immunity, known as the leucocytic theory of M. Metchnikoff. Briefly, this is as follows: The leucocytes (of which the white corpuscles of the blood are the most important) are endowed with an individuality, and have the power of enveloping small particles of foreign matter which may get into the blood, and if this matter be of a digestible nature it is assimilated by the leucocytes. Thus these leucocytes act as scavengers of the blood, and this enveloping action has been seen by the aid of the microscope. Hence when disease germs get into the blood they are attacked by these leucocytes; if the latter win we escape death or a severe attack of the disease, but if the micro-organisms win, then we lose or are lost to this world! Moreover, if the leucocytes have been once successful in such a contest with a particular species of bacteria, they will on a future occasion secure the victory over the same species with far greater ease, hence the acquired immunity.

That the Pulling Out of Teeth is a Cure for Any Form of Deafness

"If a diseased tooth has caused any certain form of deafness, its extraction would most probably relieve the deafness, and enable proper treatment to effect a cure, provided the ear has not suffered organic alteration through the tooth; but the mere haphazard extraction of such tooth to cure deafness, irrespective of its cause, would be irrational and bad practice. To the question, 'Does the extraction of teeth cure deafness?' therefore, I, as a general reply, say 'No.'"—Dr. John Cooper Torry, M.R.C.P.

"Deafness is often associated with irritation of the nerves supplying the teeth, and the extraction of the offend-

ing tooth will often relieve the deafness, especially when there is inflammation of the root of the tooth."—Dr. Chas. Warden.

"Deafness may result from the exposure of a dental nerve, setting up reflex irritation; the extraction of the tooth would thus relieve it."—Dr. W. Allen.

Hence we see the above authorities are agreed that it is only *in particular cases* that the extraction of a tooth may be beneficial.

That a Sty on the Eyelid can be Cured by the Lick of a Dog

"Possibly, but the remedy is uncertain and too dangerous."—Dr. J. C. Torry, M.R.C.P.

To this, and to the further question, "Can a sty be cured by rubbing it with a wedding-ring?" Dr. Warden replied, "A sty is suppuration of a follicle, and probably *any* friction may help to disperse it or, under pressure, break it; being broken, the lick of a dog might cleanse it, but its saliva might also be injurious, and even poison it."

We have also seen it stated that a sty is certain to go away if struck nine times with a tom-cat's tail. Whether the tail has to be attached to a cat at the time is not said; if it has, then probably puss would object, and the last state of the eye would be worse than the first.

A sty usually begins in the follicle of an eyelash, and the extraction of the eyelash is one method of treating a sty.

A number of the minor medical fallacies are not worthy of separate treatment, hence we give them *en masse,* and have pleasure in stating that Drs. Allen, Lane, Torry, and Warden affirm that they *are* fallacies. They are as follows:—

That if you buy a wart (saying, "I will give you a penny for that wart") it goes away.

That you can remove warts by rubbing them with a piece of meat and then *burying the meat!*

That a basin of water put under a bed prevents cramp in the person using the bed.

That sulphur or corks in one's socks or bed prevents cramp.

That a raw potato carried about the person is a preventative against rheumatism.

That blackberries are poisonous in October and not in September.

That eating a mouse is a cure for whooping-cough!

That if you cut your hair at the New Moon it makes it grow strong.

That an onion fastened up over the door prevents illness.

That if the water eggs have been boiled in be applied to the hands it will produce warts on them.

For those who are troubled with warts we may add that they may be removed by means of strong acetic acid or caustic soda, dropped on gently through a small tube until the wart is almost saturated with the fluid. Repeat this treatment for two or three days if necessary. Care must be taken to preserve the skin surrounding the wart from being touched with the acid, or it might get burned.

One similar application of fuming nitric acid will also have the desired effect, but great care is necessary with this very strong acid.

That Tetanus (Lockjaw) is Produced by Cutting Some Ligament or Tendon between the Finger and Thumb

"Of immense importance is the identification within the last few years of the specific cause of tetanus, or lockjaw. Ever since Carle and Rattone proved, in the year 1884, that tetanus was a disease capable of being communicated from one subject to another, inasmuch as rabbits inoculated with the pus taken from the infected part of a man who had died of tetanus also succumbed to the same disease, numerous investigators have been attracted towards this field of inquiry. Nicolaier was the first to discover that certain bacilli, widely distributed in the superficial layers of soil, were capable, when subcutaneously inoculated into mice, guinea-pigs, and rabbits, of setting up symptoms typical of tetanus from which they subsequently died. Kitasato, a Japanese pupil of Dr. Koch, was the first to procure the tetanus bacillus in a pure condition.

"The spores of the tetanus bacillus are very widely distributed, not only in garden soil, but in stables, haylofts, &c., and as they retain their vitality and their virulence for many months, even when dried and kept at the ordinary temperature of the air, or buried in soil, they must be reckoned amongst the most determined and cruel of our microscopic foes."—Dr. Percy Frankland, F.R.S., in "Our Secret Friends and Foes."

The above is quoted to show that tetanus is due to a specific bacillus and not to the merely mechanical severance of some ligament between the finger and thumb, which is erroneously supposed to be connected with the muscles of the jaw.

As the disease is due to a bacillus, a cut on any exposed part (which is more likely to get inoculated) is liable to produce the complaint, and this bacillus occurring plentifully in soil, a cut on the hand is rather dangerous for those who handle soil much. It may be that as there is no bone near the surface between the finger and thumb to stop a sharp instrument, a cut there may usually be a larger one than in any other part of the hand, and then, being larger, the chances of infection are greater, though Dr. H. Bond says that a cut on any other part of the hand or body is just as liable to produce tetanus if the chances of infection are the same in all cases.

Dr. Newman, M.D., F.R.S.E., D.P.H., in "Bacteria," page 170, says:—"The popular idea that a severe cut between the thumb and index finger leads to tetanus is without scientific foundation. It is not the locality of the wound nor its size that affects the disease. A cut with a dirty knife, a gash in the foot from the prong of a gardener's fork, the bite of an insect, or even the prick of a thorn have before now set up tetanus."

The following paragraph appeared in the *Daily Mail* of April 19th, 1901:—

"During an inquest on a child at Stepney yesterday Dr. Morris said that death was due to tetanus, or lockjaw, set up by the use of fuller's earth. The coroner remarked that he held a similar inquest about two months ago. It was a foolish idea that lockjaw could only be caused by a cut between the thumb and first finger. It had been clearly established that it was always associated with dirt in some way or the other."

That a Frosty Winter is More Healthy than a Mild One

Who has not heard the expression, when the weather at Christmas time has been mild, "This unseasonable weather is most unhealthy"?

We, ourselves, enjoy a bright, frosty day, and no doubt a dull, damp, foggy, *mild* day could be picked out which

would be more harmful to persons suffering from certain diseases; but we are not considering the weather in relation to any particular disorder, age, or sex, but to the whole community as it is. In *Nature*, of April 5th, 1894, page 547, this note occurs: "Mr. W. H. Dines read a paper on the relationship between the mean quarterly temperature and the death-rate. The Registrar-General's quarterly returns for the whole of England since 1862 were taken by the author, and the number of deaths in each quarter expressed as a departure per 1,000 from that particular quarter's average; the value so obtained being placed side by side with the corresponding departure of the temperature at Greenwich from its mean value. The rule seems to be that a cold winter is unhealthy, a mild winter healthy, and that a hot summer is always unhealthy, and a cold summer healthy."

The complete paper, "On the relation between the mean quarterly temperature and the death-rate," may be seen in the *Quarterly Journal* of the Royal Meteorological Society, vol. XX., page 173 (1894).

There is some more information on the subject in connection with the fallacy, "That a green Christmas makes a fat churchyard," page 230.

That Consumption (Phthisis or Tuberculosis) is Not Infectious

As we have pointed out elsewhere, *all* diseases are now believed to be due to micro-organisms, each disease being produced by a particular micro-organism, and in 1882 Koch published the results of his researches, which proved that consumption is due to the presence of what has now been called the *tubercle bacillus*. This bacillus is found in the sputum of phthisical patients, hence if the sputum be allowed to get dry* it is carried about by wind and other methods. The *tubercle bacillus* has been found in the air of rooms occupied by consumptive patients.

If these bacilli be inhaled by a person with consumptive tendencies it is likely to develop phthisis in him, and may even do so in the case of a healthy person. Hence healthy persons should not occupy the same bedrooms as consumptive patients.

Dr. E. S. Reynolds, M.D. (Lond.), says: "It must be

* The patient should expectorate into a spittoon containing carbolic acid (1 in 20).

considered as practically certain that one case of phthisis has always been 'caught' from some other case of phthisis, just as with other infectious diseases."

Dr. Alex. Hill, M.D., M.R.C.S., Master of Downing college, Cambridge, in his lecture to the Congress of the Sanitary Institute at Birmingham, in September, 1898, said: "Tuberculosis was of slow development, and the infection might not be discovered until months after it took place.

"People talked of consumption being brought on by a chill. To talk of any disease being due to a chill was stuff and nonsense. The chill might direct attention to the disease, or even be the cause of its immediate manifestations, but it never caused it."

Between 1860 and 1890 the mortality from phthisis fell from 2.528 to 1.635 per 1,000, or the decrease was as 3 to 2, *i.e.* 33 per cent. less.

Absurdities in Medicine

"The industrious nosologist Sauvages has calculated that there are about 2,400 disorders to which the human frame is liable, and for which it is our sacred duty to investigate every object in nature that can alleviate them. At first, almost everything was indiscriminately received; and then as arbitrarily rejected. Experience has at length enabled us to select from the vast farrago those which really possess the reparative power, and to establish a system which is pretty universally recognised throughout all parts of the globe that have been illuminated by the torch of science. No longer does the talisman, the amulet, work upon a disordered imagination. Charms, witchcraft, and astrology have lost their influence; and although for a time some daring quackery absorbs the public attention, the good sense of the community, aided by the scrutinising vigilance of the medical world, overwhelms it with the contempt it merits. The sponge that wiped the consecrated table of the Pope is no longer superstitiously venerated as a healer of wounds; nor does a throng of unhealthy individuals surround the carriage of our king to obtain the royal touch, once thought to be a specific against scrofula. We no longer find, as in our first pharmacopœias, remedies in human skulls powdered, in parings of the nails, in wolf's liver, in common bed-bugs—all of which, in their appropriate Latin names, obtained the

sanction of our learned bodies. The progress of the Materia Medica is now less impeded by superstition, by credulity, ignorance, impudence, false theory, avarice, and a blind obedience to the writings of the ancients. Still, however, much remains to be done, and diligent examination is necessary before we rashly receive into our pharmacopœias substances whose effects upon the tissues of the human body are not thoroughly understood."—Dr. Sigmond.

Sympathetic Powder

Sir Kenelm Digby's "Powder of Sympathy," the celebrated remedy of the middle of the seventeenth century, derived its virtues, not from its composition, but from the mode of its application; for it was not to be applied to the wound, but to the weapon by which the wound was inflicted: the wound was ordered to be merely closed up, and then no further care was taken of it. Most men of sense, indeed, ridiculed the proposal; but after being fully tried, it was found that the sympathetic mode of treating wounds was more successful than those plans which proceeded upon what were considered scientific principles; and it continued to gain ground in public estimation, until at length some innovator ventured to try the experiment of *closing up the wound without applying the sympathetic powder to the sword.* Wiseman, who wrote about fifty or sixty years after the introduction of this mysterious operation by Sir Kenelm Digby, in describing the importance of keeping the divided parts in union, says, "for here nature will act her part by the application of blood and nourishment to both sides indifferently, and finish the *coalities* without your further assistance. And this is that which gives such credit to the Sympathetic Powder," by which wounds were to be cured, although the patient was out of sight; a piece of quackery scarcely credible. The virtues of this powder, Sir Kenelm maintained, were thoroughly inquired into by King James, his son the Prince of Wales, the Duke of Buckingham, with other persons of the highest distinction; they were all registered among the observations of the great chancellor Bacon, and were to be added by way of appendix to his lordship's "Natural History."

Blagrave, in his *Astrological Practice of Physic,* gives the following receipt for Digby's famed Sympathetic Pow-

der: "Take Roman vitriol six or eight ounces, beat it very small in a mortar, sift it through a fine sieve, when the sun enters Leo. Keep it in the heat of the sun by day, and dry by night, and marvellous cures may be done by it."—John Timbs, F.S.A.

Arabs and the Plague

"The Arabs seldom employ medicine for the Plague; but, though predestinarians, the common belief in Europe is erroneous that supposes they use no precautionary measures. Burckhardt states that many of the townsmen fled from Medina to the desert, alleging as an excuse that, though the distemper was a messenger from Heaven, sent to call them to a better world, yet, being conscious of their unworthiness, and that they did not merit this special mark of grace, they thought it more advisable to decline it for the present, and make their escape from the town. The Sembawees have a superstitious custom of leading a she-camel through the town, covered with feathers, balls, and all sorts of ornaments; after which it is slaughtered, and the flesh thrown to the dogs. By this process they hope to get rid of the malady at once, as they imagine that it has been concentrated in the body of the devoted animal.—"Hist. Arabia," by A. Crichton.

That Sunstroke Cannot Occur unless a Person be Subjected to the Direct Rays of the Sun

Fortunately, though many of us may fall into the errors of belief pointed out in this book, such ideas, while distinctly undesirable, are not exactly dangerous. But this is not the case with a considerable proportion, and the fallacy we are dealing with now is a case in point. By thinking that it is only when directly under the action of the sun that this misfortune can occur, we are very liable to be careless under other, though equally dangerous conditions.

A reference to Quain's "Dictionary of Medicine" (3rd ed., page 1641) will soon disabuse one on this point. "Heat-stroke" would more correctly indicate the nature of the trouble. It is due to heat alone, and may occur in any country or climate. Stokers, workers in steel works and glass works, and others employed in hot places are particularly liable to this malady. It is not a dry heat which is so dangerous, for if the air is dry it causes a rapid evapora-

tion of the perspiration from the skin, and this action carries away the excess of heat from the body. When a high temperature is accompanied by a moist atmosphere, thus preventing rapid evaporation from the skin, then we have the most trying conditions, especially if there is no wind and many people are congregated. A dry temperature of 100° F. is far less trying than one of 80° F. with a high-percentage humidity.

That a Baker's Trade is Unhealthy, and that consequently the Death-rate is high among Bakers, and that the most Unhealthy Occupations are those connected with Chemical Industries

Dr. John Beddoe, M.D., F.R.S., in his article on "Mortality" in Quain's "Dictionary of Medicine," refers to this fallacy, and points out that the death-rate among bakers is practically the same as it is among solicitors, domestic servants, watchmakers, shoemakers, saddlers, bricklayers and blacksmiths, all of these being slightly above the average. Medical men and musicians have a high mortality, and the highest of all is among innkeepers and hotel and public-house servants. Dr. Beddoe says:—"The chief causes of a high death-rate in males are evidently alcohol and the irritation of inhaled dust." The lowest death-rate occurs among clergymen.

There was an article on the subject in the *Daily Mail* of July 7th, 1899. The National Temperance League publish a small card giving the leading statistics succinctly, and, of course, the occasional supplements to the annual reports of the Registrar-General for England give the fullest and most reliable information on this subject.

That Town Fogs are not Unhealthy because they contain a lot of "Sulphur" (SO_2)

It is doubtless a good practice in one sense to look on the bright side of things, but it may also be harmful as when this spirit makes us put up with a state of affairs that should *not* be tolerated. *E.g.* until the recent electrification of the "Inner Circle," the atmosphere in the tunnels of that line was a disgrace to humanity and modern civilisation; and yet in those days which have only just passed, there were Mark Tapleys who told us that that atmosphere was really beneficial on account of the "sulphur" (really sulphur dioxide) it contained.

In a similar manner those people who are wanting in sufficient energy to try to get the smoke nuisance remedied in our large towns, attempt to lessen the efforts of others and to justify their own inaction by saying that the fogs are really good things! The facts are that a heavy London fog causes a very large percentage increase in the London death-rate, as anyone may prove for himself by studying the vital statistics published by the Registrar-General. To take a particular case. There was a particularly bad fog during the first week of November, 1901, and its effects were clearly brought out in the official returns published on November 13th, 1901. Three weeks before, the death-rate *in the thirty-three large towns of England and Wales* was 16.7 per thousand, but during the fog week it rose to 19.7 per thousand, an increase of 18 per cent; while in London it rose in the same time from 16 to 19.4 per thousand, *i.e.* an increase of 21.2 per cent. Thus it will be seen how little statistics have done towards popularising this fallacy.

Of course, fog chiefly affects those whose respiratory organs are weak or diseased, and this fact was only too well brought out by the same fog, for the deaths from diseases of the lungs increased in the same three weeks from a total of 196 per week to 445 per week, *an increase of 127 per cent.*

New York has overcome the fog nuisance (which it has been estimated by the Hon. Rollo Russell costs London £5,000,000 *per annum!*) by prohibiting the use of bituminous coal. They burn anthracite instead, as it is much cheaper than in England. We could almost entirely remove the deleterious effects of our fogs by the distribution of producer gas for warming and cooking. Another method—and a very simple one—would be for nothing but "coalite" to be burned in London.—*Vide* the author's short paper on the subject read before the Smoke Abatement Congress, in London, December, 1905.

That Diphtheria Attacks only the Throat of the Patient

Dr. James Fletcher, D.P.H., Resident Medical Officer, Ham Green Hospital, Bristol, read a paper on "Postscarlatinal Diphtheria and its Prevention," at the Sanitary Congress held in Bristol July 9th to 14th, 1906. The paper appears in the "Journal of the Roy. San. Inst.," vol.

xxvii., No. 8, pp. 382 to 387, and the following is a quotation from it :—

"One cannot help being struck by the frequency with which the nasal cavity has been found harbouring the diphtheria bacillus, at any rate, in Bristol ; and as this has a distinct bearing on what follows, the following statistics are of interest : out of 1,036 cases of diphtheria admitted to the Ham Green Fever Hospital during the years 1901-1905, 246 had the disease in the nose only, and 103 others in the nose as well as the throat."

Thus in 349 cases, or 33.7 per cent., the nose was affected.

That Measles may be Cured by Taking the Afflicted Child through Three Parishes in a Day

This is one of those utterly absurd fallacies which are not worthy of our attention ; and our only reason for including it is because, ridiculous as it is, it is evidently still rife, as the following notice from the *Daily Mail* of March 26th, 1906, shows :—

" Witchcraft and superstition die hard in Devonshire. There has lately been an epidemic of *measles* at Chittlehampton, and in the hope of curing their children parents have dragged the little sufferers through three parishes in one day, which proceeding is said to effect a certain cure.

" Others have taken their offspring to women who have not had to change their name by marriage, in the belief that whatever such women gave sick children to eat would act medicinally. This treatment has not proved effectual, but still there are people who are prepared to continue it."

That at the Seaside Death always occurs as the Tide goes out

Charles Dickens has encouraged this fallacy in "David Copperfield." Probably in this instance the popular fancy has seized upon a false analogy, by which the life of the patient and the tide are both supposed to ebb at the same time. Having formed an opinion, or formulated a theory, the popular (but very unscientific and unsatisfactory) method is to try to find facts which fit the theory, while those which do not so fit receive scant notice. Hence, deaths which occur as the tide goes out would be noted and remarked upon, while others would be passed unnoticed.

That Whooping Cough Leaves only in the Month of May following the Attack

Whooping-cough is more common in the early Spring in this country, and frequently disappears with the advent of Summer, *i.e.* about May. This probably explains the popular notion, but there is no reason why this should be so, except in order to give the case time to run its course.

That a Wart will Leave a Person if a Lock of Hair be cut from the Nape of his Neck without his Knowledge

To be cut without the knowledge of the person whose hair it is, the nape of the neck is obviously the best point of attack. The secrecy which is deemed essential enters into many of the beliefs or fallacies in connection with warts and other tumours. It has been suggested that the assistance of the Devil was required to effect the cure, and secrecy was therefore to be desired.

That People with Florid Complexions are Particularly Healthy

The cause of the colour must be investigated by a medical man before he can form an opinion as to its indications; but high colour may be associated with grave physical disease, and Dr. Gustav Jaeger, in "Health Culture," says:—" . . . . the current conception of florid exuberant health is altogether erroneous."

That "Large Neck" or Goitre can be Cured by Drawing a Live Snake across it Nine Times

The principle (if it is worthy of such a name) involved in this treatment is common to a very large number of medical fallacies. It is for this reason we have omitted a very large number of them. The principle is the repulsiveness of the treatment, which, in certain kinds of cases (*e.g.* hysterical ones), would be sufficient to check the abnormal condition of the patient. Beyond this (which, remember, applies only to a limited class of cases) there does not appear to be a vestige of truth in the belief. The nine times specified in this case appear to be connected with the alleged mystic quality of the number three and its multiples.

The cure is mentioned by Mr. Rovert, in "Notes and Queries," vol. iii., page 405, as being in use at Withyam, Sussex.

That it is Desirable for Children to be Fat, as they are then more likely to be Healthy

There is healthy and unhealthy fat. Many rickety children are abnormally fat as the result of taking injudicious foods, such as many of the much-advertised starchy preparations. Fat children are often backward in walking, probably on account of their muscles not being properly developed. *The Lancet* dealt with the question as long ago as 1872, and said that fat children are less able to resist disease. Dr. E. Smith also supports this view in his work on "Foods," and ends by saying:—". . . . the more fattening infants' foods are, the less likely are they to make muscular men and women."

That a Cure for Fits is to Walk Three Times Round the Communion Table in a Church at Midnight

Probably the effect on a nervous patient of this ghostly ordeal would be, in some cases (hysterical), sufficient to check the fits. We notice the recurrence of the mystic number three in this fallacy. This cure was mentioned by "H.G.T." in "Notes and Queries," vol. iv., page 258, as coming from the parish of Launceston, Devon. Mr. Haughmond St. Clair also gave a slightly amplified edition of it in "Notes and Queries," vol. ix., p. 344, which he took from *The Times* of March 7th, 1854.

That a Medical Man may Legally Smother a Hydrophobic Patient

M.A., Balliol, gives this as one of many instances of Somersetshire folk-lore in vol. ix., page 536, of "Notes and Queries," and the author well remembers his mother telling him of the alleged right of a doctor in such a case. It has been suggested that this fallacy has arisen through a hydrophobic patient being regarded as "possessed of devils," and that therefore he might be killed in the same manner as, in the "good old times," witches were allowed by law to be put to death.

That Warts may be Cured by Rubbing them over with a Black Snail, which must be Impaled afterwards on a Hawthorn

This cure was given by Mr. T. T. Wilkinson, in vol. iii., page 55, of "Notes and Queries," as being a piece of Lancashire folk-lore.

The idea seems to be the substitution of a corruptible body for the wart, and this is a common feature of many such cures. The same principle occurs in the old times' practice of making wax figures of one's enemies, and then sticking pins into them (the models!) in the belief that that caused the individual pain. Some readers will remember, too, having seen artificial models of limbs put in churches on the Continent as an alleged means of restoring the original limbs to health. This principle of substitution or redemption is seen in the following fallacies, which consequently are not worth dealing with in detail:—

That if a bag containing as many pebbles as a person has warts be tossed over the left shoulder, it will transfer the warts to the person who picks up the bag.

That if warts be rubbed with a cinder, and this then be tied up in paper and dropped where four roads meet, it will transfer the warts to the person who opens the packet.

That warts may be cured by taking a corresponding number of nodules (knots) from the stalks of any cereal (wheat, oats, barley), wrapping these in a cloth, and depositing the packet in the earth, all the operations being done secretly. The warts are said to disappear as the nodules decay.

That a cure for warts is to take a piece of twine, make as many knots upon it as there are warts to be removed, touch each wart with the corresponding knot, and bury the twine in a moist place, saying at the time, "There is none to redeem it beside thee."

In Lord Bacon's "Sylva Sylvarum; or, A Natural History in Ten Centuries," the great philosopher gives a minute account of a wart cure, from personal experience, in the following words:—

"The taking away of warts by rubbing them with somewhat that afterwards is put to waste and consume, is a common experiment; and I do apprehend it rather, because of mine own experience. I had from my childhood a wart upon one of my fingers; afterwards when I was about sixteen years old, being then at Paris, there grew upon both my hands a number of warts (at least a hundred), in a month's space; the English Ambassador's lady, who was a woman far from superstition, told me one day she would help me away with my warts; whereupon she got a piece

of lard with the skin on, and rubbed the warts all over with the fat side, and among the rest, that wart which I had from my childhood; then she nailed the piece of lard with the fat towards the sun, upon a post of her chamber window, which was to the South. The success was, that within five weeks' space all the warts went away, and that wart which I had so long endured for company; but at the rest I did little marvel, because they came in a short time and might go away in a short time again, but the going of that which had stayed so long doth yet stick with me. They say the like is done by rubbing of warts with a green elder stick, and then burying the stick to rot in muck."

That Cramp can be Prevented by Placing One's Shoes with the Toes just Peeping from beneath the Coverlet

The above was given by Mr. T. T. Wilkinson in "Notes and Queries," vol. iii., page 55, as an instance of Lancashire folk-lore. It is very similar to the alleged cure which tells one to put one's slippers under the bed with the soles uppermost. This latter cure is given by J. M. B. in vol. vi., page 601, of "Notes and Queries," as being practised in the neighbourhood of Penzance. One of the author's medical friends says that cramp is a more common phenomenon in nervous people, who probably would be more influenced by some such form of ritual as is here prescribed than a less nervous subject, and that consequently some good might possibly result from what otherwise appear to be most ridiculous practices.

Yet another "cure" is to tie a garter round the *left* leg *below* the knee.

That any Evil Results of a Dog bite may be Prevented by the Owner of the Dog Giving Some of its Hair to the Person Bitten

Bœoticus (Edgmond, Salop), sent the following notice, which he had just seen in a daily paper, to "Notes and Queries," and it appears in vol. v., page 581:—

"At Oldham last week, a woman summoned the owner of a dog that had bitten her. She said she would not have adopted this course had the owner of the animal given her some of its hair to ensure her against any evil consequences following the bite."

The evil results of a dog-bite depend upon the health of the animal. If this should be all right, very little incon-

venience is likely to arise, especially if the bite be through some article of clothing. Now by far the larger number of dogs that bite are healthy dogs, consequently many methods of treatment are fallaciously supposed to be useful.

The author knows of a recent case where a cat bit a servant's upper arm through her dress. She went off to a doctor, who cauterised it, and explained afterwards to the mistress that this was quite unnecessary (as far as the bite *per se* was concerned), but he had to do it to satisfy the girl! The cauterising made a far more painful wound than the bite.

That Whooping Cough may be Cured by Letting a Piebald Horse Breathe on the Child Afflicted

Probably the unexplained strangeness of appearance of a piebald horse would give the ignorant mind the idea of wonder-working capacity. *Omne ignotum pro mirifico.*

That a Child may be Cured of Consumption by Carrying it through a Flock of Sheep as they are let out of a Fold in the Morning

The only spark of possible truth in this cure appears to be the early morning air treatment, which now, many years after the above method was invented, has become fashionable; but instead of a flock of sheep, Davos Platz is substituted.

That Articles of Clothing may be Satisfactorily Disinfected by Exposure to Dry Heat

"The prevalent idea of disinfecting articles of clothing by an exposure to dry heat in an oven is most mischievous and unsound, because, without the risk of injuring the materials or fabrics, no greater heat than 220° F. can be employed, and this temperature, unless maintained for something like eight to ten hours, is incapable of destroying infection. Hot air moistened with steam is somewhat better than hot dry air, but much inferior in both penetrating and germ-killing power to steam, either super-heated or saturated."—Drs. Notter and Firth in "Hygiene," page 294.

That, as a rule, People when just about to Die Suffer Agony

The following letter on this fallacy appeared in the *Daily Mail* of January 16, 1907:—

"THE DEATH AGONY.

"To the Editor of the *Daily Mail.*

"Sir,—Within the last few days I have twice read in the newspapers the expression 'the last scene of the death agony,' one in connection with the death of the Baroness Burdett-Coutts and the other with the Shah.

"I am much afraid that this conveys to the mind of the layman that we must all (or the majority of us) pass through this state, whereas few of us will. Except in rare cases, the 'agony' of death is a myth.

"The senses are mercifully darkened as the pall of death is drawn over the traveller about to pass into the undiscovered country, and he drifts on 'through slumber to a dream, and through a dream to death.' This may comfort some of your readers. "CLARENCE I. ELLIS, M.D., etc.

"Newcomen Lodge, Dartmouth, S. Devon."

The author's wife, in her former career as a hospital nurse, saw literally hundreds of persons die, but she says that none of these cases suffered any death agony, even though, in many cases, they may have suffered painful illnesses.

That a Boil "Cleans Out" the Blood of the Person who has it and Tones up his System, and that it is possible to take Cold in a Boil

Boils, like most diseases, are caused by microbes, this time by one named Staphylococcus pyogenes aureus, who has a nasty little habit of getting into the sebaceous glands of the hair-follicles. The entrance is often caused by the skin getting chafed, as by a collar. Not only do boils not "tone up" the system, but, if they are large or numerous, they may cause extreme debility. Dr. L. K. Hirshberg, in dealing with a number of popular medical fallacies in *The American Magazine* (page 655) for October, 1906, says, "The notion that boils purify the blood and 'tone up' the system is but one of 10,000 popular medical fallacies. . . . The popular idea that it is possible to take cold in a boil, and that the result is dangerous, is utterly and hopelessly nonsensical. By a cold in a wound a layman means an infection. A boil is already infected, else it wouldn't be a boil. Hence it is absurd to believe that it may be infected again."

That a Linseed Poultice is especially Valuable on account of the Linseed of which it is made

Poultices have been very popular in the treatment of certain disorders for many a long year, and these poultices have been made of a number of different substances, such as bran, bread, and linseed. The latter substance is somewhat more convenient than the others, because it holds together better. The virtue of a poultice, however, does not lie in the material of which it is made, excepting the hot water. It is the heat of the hot water which does the good, and the bran, bread, or linseed meal merely acts as a sponge. The specific heat of water is greater than that of any other substance, and hence we should aim at utilising as much water as is practicable in the formation of a poultice. This is now being done by means of fomentations instead of poultices. A fomentation is formed of lint, flannel, or sponge, soaked in water as hot as can be borne by the patient.

That Malaria is Caused by Bad Air

The word "malaria" is certainly largely responsible for this fallacy, and no doubt the mistake of the name given is responsible for the word. It has now been established, without a doubt, by Major Ronald Ross, the British School of Tropical Medicine, and others, that malaria is caused by the micro-organisms injected into the blood by the bite of a certain variety (anopheles) of mosquito or gnat. This explanation of the cause of the disease was first suggested by King in 1883. These mosquitoes breed freely in marshy ground where there are puddles of water, and Major Ross found that the conditions of health could be greatly improved by having all the puddles filled up with earth, or by pouring paraffin oil on the surface of the water as a temporary remedy.

FALLACIES CONNECTED WITH THE ANIMAL KINGDOM

FALLACIES CONNECTED WITH THE ANIMAL KINGDOM

(a) MAMMALS

That a Mad Dog avoids Water, and that More Dogs go Mad in the so-called "Dog Days" than during any other Period

ACCORDING to Mr. John Timbs, F.S.A., a mad dog will both drink and swim in water as usual, and Dr. J. R. Bradford, D.Sc., M.D., F.R.C.P., F.R.S., in his article on rabies in Quain's "Dictionary of Medicine," does not say a word which implies that a mad dog dislikes water, or that there is any particular period in the year when rabies is most common. On the other hand, he gives, as the most characteristic clinical feature (in the case of the "furious" form of the disease), the high-pitched and falsetto bark. He also says that the term "hydrophobia" (meaning "fear of water") is not strictly correct, for there is *not* necessarily any fear of water during the height of the disease in man, but only great difficulty in swallowing liquids, and it is in attempting to swallow that attacks of convulsions are brought on, while in some cases the mere sight of water will bring on the convulsions.

The term "hydrophobia" is usually limited to cases of the disease in man, and "rabies" to the same disease in animals.

There appears to be a double fallacy as regards "dog days"; first that dogs go mad more particularly during that period, and secondly that the term "dog days" arose from this supposed fact. As a matter of fact, the term has nothing to do with the animal we call a dog. The period is so named after the dog-star, for it was considered by the ancients (even as far back as 450 B.C.) that when the dog-star and the sun rose together, then the temperature was greatest owing to their combined effects.

Partly, no doubt, because the period when the dog-star and sun join forces has gradually changed during so many centuries, there has been some diversity of opinion as to the

exact period called the "dog days," but it is now usually agreed to be from July 3 to August 11 inclusive.

The following article on the subject of hydrophobia appeared in *Answers* of August 29, 1896:—

"Hot weather is supposed to produce mad dogs pretty much as it produces butterflies. But this is only one of the many fallacies regarding that terrible disease. According to the officials of the Dogs' Home in Battersea, March and June are the worst months for dogs, so that the hot weather can have little to do with hydrophobia.

"Another ancient error which gives rise to uneasiness is the belief that the bite of a mad dog is sure to cause hydrophobia. But the truth is that most people bitten by undoubtedly rabid animals escape altogether.

"In one town, out of 943 persons and animals bitten by dogs supposed to be mad, only 28 got hydrophobia.

"In another place, out of 137 people bitten by reputed mad dogs only 6 died. That is to say, if you are bitten by an apparently rabid dog, your chances of getting off with nothing worse than a wound are about 25 or 30 to 1.

"Perhaps a description of what hydrophobia really means will reconcile you to that troublesome muzzling order. After the bite you are quite well for about nine or ten weeks, as a rule. Those cases where people have got ill a year or several years after being bitten are probably fables. At the end of the inoculation period, as it is called, you begin to feel depressed, irritable, and sleepless.

"Presently your chest becomes oppressed, and you can hardly breathe. It pains you to swallow food, and after a short period the act becomes quite impossible. Suppose you try to drink some water, you get a fearful convulsion of all the muscles of the body. A few hours later the very sound or thought of water will make your body stiffen like a board. For about two days this goes on. Then you gradually grow unconscious, and your heart becomes slower and feebler, till, after a few hours more, it mercifully stops.

"You neither bark nor bite, and, if you did bite, probably you would do no harm. Nervous people, by the way, have died from convulsions induced by fear from the bite of a healthy dog, and Pasteur inoculated hundreds of people of that kind merely to allay their apprehension. An amusing case of this kind was that of a foolish doctor, who ate the

flesh of a rabid dog to see whether hydrophobia could be conveyed in that way. He remained quite well until one day he read that some dogs which had eaten rabid sheep became mad. All at once he became furiously mad himself; but, perceiving that he didn't die within the regulation time, he one day jumped out of bed perfectly well.

"It is most important for every owner of a dog to know the signs of canine madness. One of the accepted traditions is that the mad dog always foams at the mouth, and has a horror of water. These are imaginary symptoms. Foam at the mouth is scarcely ever seen; so long as the animal has strength he runs in that zigzag course peculiar to the species, and has no dread of water.

"The animal begins by being fidgety, obstinate, and disobedient. The best thing you can do is, tie him up and wait, for all these symptoms are displayed in other diseases. In a day or two he gets violent, barks in a most peculiar howling way, bites every animal he comes across, snapping off the end of his own tail, or gnawing his feet if he has nothing better. He will even bite a piece of burning coal or a red-hot poker. As he is always on the move, and takes no food, he soon gets thin and weak, and dies within seven or eight days of the first signs of illness.

"Should you be one of those unfortunate forty or fifty people who are bitten in the United Kingdom every year, you ought to suck the wound at once, wash it in warm water, and cauterise it with caustic potash (this is better than hot iron, as it penetrates into every part). Then keep the wound open for five or six weeks, and you will have about twice as good a chance of escape as if you did nothing at all. On the whole, however, there is really almost as little danger in this country from mad dogs as from earthquakes or tidal waves, and very much less than from lightning."

That Whale-bone is True Bone, and that it is Found in all Whales

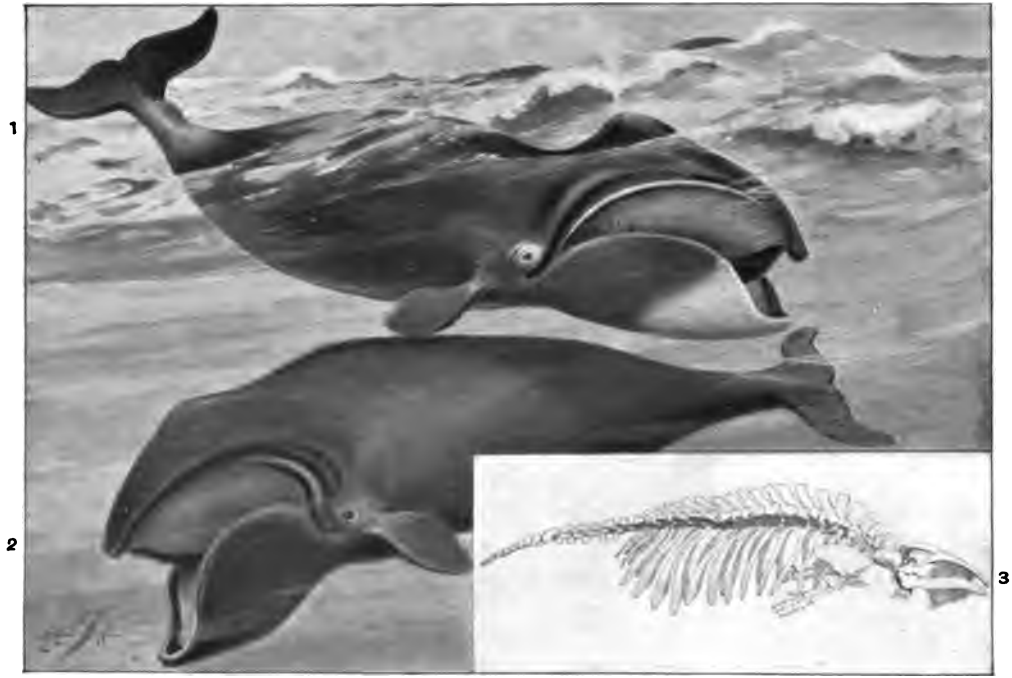
Its correct name is baleen (Lat. *balæna*, a whale). It has scarcely any of the properties of bone; its composition is different, and it is of different morphological origin. It is found attached to the upper jaw, and serves to strain the water which the whale takes into its mouth, and to retain the small animals (for a whale-bone whale's gullet is comparatively small) on which it subsists. It is not all whales which

are furnished with this appendage. It is more particularly found in the common Greenland whale *(Balæna Mysticetus)*, the Antarctic or black whale, and the American whale. These animals (for the whale is not a fish) have no teeth, and their place in the upper jaw is supplied by rows of flat plates, the inside edges of which are furnished with a fringe of bristles; these flat plates are the baleen or whale-bone. There are two rows of these plates, one on each side of the upper jaw, so that they hang down on each side of the tongue, and when the mouth is closed the free ends of the plates are directed backwards—that is, towards the gullet.

"Each of these rows consists of about 300 [Prof. W. H. Fowler, C.B., says even 380.—ED.] of these plates of baleen. There are some of these plates 12 ft. in length in South Kensington Museum, but the average length of the middle ones is about 8 ft. or 10 ft. The average weight of these plates is about 7 lb., so that a whale carries in his head nearly two tons of whale-bone."—Dr. E. Lankester, F.R.S.

That a Cat sees better in the Dark than in the Light

In the natural state a cat's prey comes out at twilight; hence the cat hunts then, and this gives rise to the idea that it sees better in the dark. The iris of the cat's eye is capable of great variation, so as to admit less or more light; thus, on a bright summer's day the pupil (*i.e.*, the aperture in the iris) is a mere vertical slit, but in the dusk it opens enormously, till there is scarcely any of the yellow iris left visible, and this adaptability no doubt enables the cat to see much better *in the dusk* than we can, for our eyes possess this power of altering the size of the pupil to a much less degree, and the eyes of the cat, being sensitive to the ultra-violet rays of the spectrum, would also enable it to see better in the dusk than we can. Then, again, cats are provided with those very sensitive tactile organs, the long hairs on either side of the upper lip, and these are of great assistance to them when moving about in the so-called "dark," but in absolute darkness all animals are equally helpless as regards their sense of sight, though some may have special organs connected with one of the other senses (as the "feelers" of the cat, and antennæ of insects), which enable them to be far better off in the dark than others.



WHALEBONE WHALES.

1. BALÆNA MYSTICETUS (GREENLAND WHALF).

2. BALÆNA AUSTRALIS (CAPE WHALE).

3. OSTEOLOGY OF THE PIGMY WHALE.

UNIV.
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MICH.

That Rats never go on a Ship that is about to Start on the Voyage on which she Founders

No doubt in the good (?) old times the Board of Trade and Lloyd's were not so careful as they are now as to the sea-worthiness of a vessel before allowing her to proceed on her journey. Indeed, this fallacy probably arose long before either of the above institutions were in existence, and a ship with a number of small leaks would probably have a large quantity of bilge water, which would flood the rats' head-quarters and make them so generally uncomfortable that they would leave for fresh ships and bilges drier! Hence we see the popular idea is founded on fact; but that the rats *never* make an error of judgment, and hence that no rat ever loses its life by the foundering of a ship, we utterly refuse to believe, for many vessels are lost, which are perfectly sound as they leave port, through bad navigation, storms, etc.

Then as to the sea-worthiness: in these days, at least, men's judgment on such matters must be superior to that of rats, and consequently if the vessel were in such a bad state that even the rats noticed it, the inspectors would too, and hence they would not allow her to proceed.

The following paragraph appeared in *Pearson's Weekly* for October 9, 1897:—

"How do Birds foretell Death?

"Most sailors believe that 'rats desert a sinking ship,' that is, refuse to go upon the last voyage which a vessel makes. Sailors suppose that the rats know instinctively when a disaster is about to occur, and they are induced with great difficulty to ship upon a vessel that has no rats aboard.

"A curious story comes from Hamburg to the effect that, a few days before the cholera epidemic broke out some two or three years ago, all the birds took flight from the city. It was then recalled that in 1884, when the cholera was raging in Marseilles and Toulon, all the birds deserted those cities, and took refuge in Hyères, which remained entirely free from cholera during the whole summer.

"In the summer of 1872 all the sparrows in Przemysl, a town of Galicia, suddenly departed two days before the appearance of the pest, and not a bird returned until the end of November, when the cholera had disappeared.

"'A little bird told me' is a common expression, but the important question seems to be, 'Who told the birds?'"

That a Whale is a Fish, and that it Spouts Water through its Nostrils

"Although the home of the *Cetaceæ* (to which class of animals whales belong) be entirely in the waters, they have several features in common with the larger quadrupeds. They belong to the Linnean class of Mammalia, or suck-giving animals; they produce their young alive; their skin is smooth, and without scales; their blood warm, and the flesh tastes somewhat like coarse beef. They have lungs by means of which they respire, and, being unable to separate the air from the water, as fishes do by means of their gills, they must come to the surface in order to breathe.

"In representations of the whale, we generally see two spouts of water mounting into the air from his nostrils, when he is above water, like artificial fountains. These are occasioned merely by the mode in which the animal breathes; and it is an error to suppose that he ejects the water through the nostrils. It is, on the contrary, the breath which is thus discharged, mixed with mucous matter, and perhaps the foam of a wave which may happen to dash over the nostrils while the whale is exhaling. When this vehement breathing or blowing is performed *under the surface,* much water is thrown up into the air."—J. Timbs, F.S.A., "Popular Errors."

Sir W. H. Fowler, F.R.S., in "Encyclopœdia Britannica," says on this subject: "Of the numerous erroneous ideas connected with natural history, few are so widely spread and so firmly believed, notwithstanding repeated expositions of its falsity, as that the *Cetacea* (the whale group) spout out through their blow-holes water taken in at the mouth. The fact is, the 'spouting,' or more properly the 'blowing,' of the whale is nothing more than the ordinary act of expiration, which, taking place at longer intervals than is the case with inland animals, is performed with a greater amount of emphasis. The moment the animal rises to the surface it forcibly expels from its lungs the air taken in at the last inspiration, which, of course, is highly charged with watery vapour in consequence of the natural respiratory changes. This, rapidly condensing in the cold atmosphere in which the

phenomenon is generally observed, forms the column of steam, or spray, which has been erroneously taken for water. It also often happens, especially when the surface of the ocean is agitated into waves, that the animal commences its expiratory puff before the orifice has quite cleared the top of the water, some of which may thus be driven upwards with the blast, tending to complete the illusion."

Dr. E. Lankester, M.D., F.R.S., gives the same explanation, but it is very remarkable that Darwin, though he refers to the spouting of whales, does not caution his readers about the usual mistake made in this connection.

That the Hyæna and Zebra are Untamable

"Colonel Sykes has taken some pains to correct the popular error respecting the ferocious and untamable disposition of the hyæna. In India the Colonel possessed a female cub, which was allowed to run about the house. On the voyage home it played with the sailors on board ship; indeed, it was as playful and good-humoured as a puppy. Subsequently Colonel Sykes placed this hyæna in the gardens of the Zoological Society in Regent's Park, and there, when full-grown, it fondly recognised its master by rubbing itself against his hand."—Proc. Zool. Soc., 1833.

The zebra may occasionally be seen performing in a circus, and several years ago the author saw Lord Walsingham's four-in-hand of zebras being photographed just by the Albert Hall, Kensington.

That Camels Carry Water in their Humps

"The hump or humps on the camel's back are mere masses of fat, without any corresponding curve of the vertebral column of the animal, and form a reserve of nourishment to be used when other supplies fail; consequently during lengthened periods of privation, and during the rutting season, when the males almost cease to eat, these masses greatly diminish in size. In its native deserts, however, the camel is more likely to suffer from lack of water than of food, and accordingly the stomach is so modified as to allow of a certain quantity of water being stored for future use. On the walls of the paunch, or first stomach, little pouches with narrow mouths are developed; these are the so-called "water cells," the biggest of which in an adult

camel measures, when dilated, about three inches in width and depth, and these serve to strain off a considerable quantity of water from the contents of the paunch, retaining it for future use by means of powerful sphincter muscles. When crossing a desert the camels are expected to carry their load (which varies from 500 lbs. to 1,000 lbs., according to the variety of camel employed) 25 miles a day for three days without a drink, getting a supply of water, however, on the fourth; but the fleeter varieties will carry their rider and a bag of water 50 miles a day for five days without drinking. It is of very great service when, the whole caravan being on the point of perishing for want of water, the acute sense of smell which the camel possesses enables it to perceive the presence of water more than a mile off; then it will break its halter and make an unerring track for the well."—J. Gibson, in "Encyclopædia Britannica."

There appears, too, to be a considerable tendency to exaggerate the period for which a camel can go without water. Prof. T. Rymer Jones, F.R.S., says "ten or even twelve days without drinking." Another says "weeks"! Lieut. Burne ("Travels in Bokhara"), on the other hand, says it is a vulgar error to believe that they can live any length of time without water. They generally pine, and die on the fourth day; and, with great heat, will even sink sooner. While Sir C. Rivers Wilson, in speaking of the march to Abu Klea, said that all the camels which had been without water from six to seven days did not survive the treatment, and that to keep them on their legs it was necessary to water them every second day.

That a "Dromedary" is not a Camel

There are two species of camel, the Arabian and the Bactrian. The Arabian (all single-humped) includes several breeds, the chief of these being the thick-built, heavy-footed, slow-paced variety, used for carrying heavy loads, and the dromedary, a name often applied to all members of the single-humped species, but properly belonging only to a thin, comparatively elegant, and fine-haired breed, celebrated for its fleetness, carrying its rider, when necessary, 100 miles a day. It is the "race-horse" among camels.

The Bactrian is the two-humped camel.

The scientific name of the Arabian specie is *Camelus*

dromedarius; that of the Bactrian, *Camelus bactrianus.* Hence we see all dromedaries are camels, but all camels are not dromedaries!

From the name *Camelus dromedarius* we see the origin of the two vulgar names, "camel" and "dromedary," and then somehow it has come about that the "dromedary" is thought to be a distinct animal. There is at least one somewhat similar instance in the vegetable kingdom. The common species of camellia is *Camellia Japonica* (the Japan rose), the name of a genus of Ternstromiaceæ. Japonica merely indicates the country where the plant is indigenous, but in South Africa the plant is called indifferently a japonica, or a camellia.

It is named camellia after George Joseph Camellus, who travelled in Asia and wrote a history of the plants of the island of Luzon.

That when you "Worm" a Dog you cut a Worm out of its Tongue

Worm: to remove the "worm" or lytta from the tongue, as of a dog; supposed to be a precaution against madness.

"Is she grown mad now? Is her blood set so high? I'll have her madded! I'll have her *worm'd.*"—Fletcher, *Pilgrim* iv. 1.

"The men repaired her ladyship's cracked china, and assisted the laird in his sporting parties, *wormed* his dogs, and cut the ears of his terrier puppies."—Scott.

"Lytta: the long vermiform rod of cartilage or fibrous tissues in the middle line and under the surface of the tongue of a carnivore; the glosso-hyal of a carnivore; the so-called 'worm' of a dog's tongue. It is vulgarly supposed to be a parasite, and is often extracted by dog-fanciers."—"Century Dictionary."

The "Encyclopædic Dictionary" says of the lytta: "This ligament is frequently cut out when the animal is young, for the purpose of checking the disposition to gnaw at everything. The operation was formerly supposed to check rabies or madness."

That Hedgehogs Suck Cows

"Superstitious ignorance, as in the case of the poor little shrew, has led to the cruel persecution of the hedgehog, because, forsooth, it was (and in some places still is) believed to drain dry the udders of cows during the night, to the

surprise of the milkmaid and the indignation of the farmer. To the slow-worm and the fern-owl (*Caprimulgus*) the same mischievous habits have been attributed, the physical impossibility of their committing such a theft being overlooked, or not appreciated. With respect to the hedgehog, this accusation, as Mr. Bell observes, is about as well founded as that by Pliny, and exaggerated by Sperling, who asserts that it ascends trees, knocks off apples and pears (Allian says figs), and throwing itself down upon them so that they may stick to its spines, trots off with the prize."—"The Royal Natural History," edited by James Wylde.

It seems scarcely possible that this should still be believed when no less than 120 years ago it was thought necessary to point it out as a fallacy, as will be seen from the following quotation:—

In the case of an animal giving suck, "the teat is embraced round by the mouth of the young one, so that no air can pass between; a vacuum is made, or the air is exhausted from its throat, by a power in the lungs; nevertheless, the pressure of the air remains still upon the outside of the dug of the mother, and by these two causes together the milk is forced into the mouth of the young one. But a hedgehog has no such mouth as to be able to contain the teat of a cow; therefore any vacuum which is caused in its own throat cannot be communicated to the milk in the dug. And if he is able to procure no other food but what he can get by sucking cows in the night, there is likely to be a vacuum in his stomach too!"—"New Catalogue of Vulgar Errors," by Stephen Fovargue, A.M., 1786.

That Large Animals Require a Luxuriant Vegetation

Darwin ("Voyage of a Naturalist") refutes this in no uncertain manner, his words being: "I do not hesitate to say that it is completely false." He goes on to point out that the fallacy has corrupted the reasoning of many geologists. It appears to have arisen in this way: Until comparatively recently India was the only tropical country known to many Englishmen, and out there they came to associate big game with large and rich vegetable growth. In South Africa, however, most of which is arid, and where, consequently, the vegetation is anything but luxuriant, there are large numbers of big animals, and, as another illustra-

tion, might be mentioned the American bison (more commonly and in error called a buffalo), which inhabits the prairies and savannahs of North America.

That it Improves the Resulting Cat's Fur to Skin the Cat Alive

Even if it did, the end most certainly does not justify the means, though no doubt many might be found who differ from us, just as there are numbers of people who are so indifferent to the sufferings of young birds that they wear parts of, or whole, birds in their hats. The plumage of birds is best in the nesting season, so the parent birds are slaughtered then, and the young consequently starve in their nests.

Dr. E. Lankester, F.R.S., in the "Uses of Animals to Man," writes thus: "It is a vulgar impression that if cats are skinned alive their skins are more valuable. Now, I have the authority of both Mr. Roberts and Mr. Nicholay for saying there is not a particle of truth in this belief. They are not only utterly unaware of any difference between the skin of a cat when taken off alive, but they were never acquainted with a furrier, who had thought of such a thing. Yet most assuredly it is a fact that there are wretches who, acting on this impression, have skinned cats alive, and who have been brought before our public courts in consequence."

Cats are bred in Holland for the sake of their fur.

That a Mad Dog Rushes about Foaming at the Mouth

In the two and a half page article by Dr. John Rose Bradford, F.R.C.P., F.R.S., in Quain's "Dictionary of Medicine," on rabies, there is not a word about a dog, or any animal, suffering from rabies, *foaming* at the mouth, though the symptoms are minutely described. Dr. Bradford does mention, however, that in the last stages of the disease, when the animal is so paralysed that it *cannot stand,* much less rush about, the jaw drops, and considerable quantities of *stringy* or *ropy* saliva hang from it. One of the most characteristic symptoms is that the bark becomes exceedingly high-pitched.

Another significant fact about Dr. Bradford's article is that he does *not* say that rabies is more common in July and August than in any other time of the year.

The Muzzling Order, instituted in 1897, has greatly reduced the disease, and in 1899 no human being died of

hydrophobia in England or Wales. Such a record had not occurred during the previous 50 years. In 1900, however, there was what (the disease being extremely rare) we may call an epidemic in South Wales, eleven cases being reported.

Another interesting fact is that Dr. Bradford does not mention the popular idea that a mad dog (as the word hydrophobia implies) fears water; but in dealing with the subject of " Hydrophobia " (this term being used for cases of rabies in man), he says that there is great difficulty in swallowing liquids.

That Orang-outangs use Sticks to Aid their Walking

An inexperienced actor or speaker does not know what to do with his hands, and apparently artists experience a like difficulty in disposing of the hands of their first cousins, for in many pictures of these anthropoid apes they are shown clasping long sticks. These creatures are very agile climbers, but are slow at moving along on ground. Their arms being much longer than their bodies, they are able to use them as a lame man uses crutches, and swing their bodies forward. In doing this, the hands are not put palms down on the ground, but the backs of the first and second portions of the fingers are placed on the ground, thus making the effective length of the arms still greater. This method of progress may be seen in some zoological gardens—for example, in the London one.

That Cows eat Buttercups, and that the Quality of their Milk is thereby Improved

The Field of June 9, 1906, exposed this old belief, calling our " dear little buttercup, sweet little buttercup " a useless and obnoxious weed, having no value as a food for cattle, for the simple reason that cows and other cattle won't eat them, and consequently they cannot very well improve the tone of the butter. Apparently, however, their presence in a pasture indicates the richness of the soil, and hence its ability to produce a heavy crop of rich milk-yielding grass. Dr. Brewer supports these statements: " The cow in every possible way does its best to avoid the buttercup, which is a nauseous, bitter herb, and, in walking through pastures as bare as possible, the buttercup is left in all its luxuriance. Cows may be seen tearing away the grass round a buttercup plant *(Ranunculus bulbosus)*, and leaving it untouched, with

every particle of grass cropped close round it. Indeed, you may see pasture apparently most luxuriant, but on a closer inspection there is nothing but buttercups left. Farmers like to see them, because they prefer good, sound, dry, old pastures, and the remainder of the herbage is generally good. But cows avoid them as much as possible."—*Athenæum*, No. 1,489.

Other names for a buttercup are butter-flower and crow-foot.

That the Okapi is a Hybrid between a Zebra and a Giraffe

In the Natural History Museum, South Kensington, London, there was, in July, 1906, a case with a couple of okapi in it, and on the case was a label stating, "The idea that the okapi is a hybrid between a zebra and a giraffe is erroneous."

That Monkeys when searching through their own or other Monkeys' Hair are looking for Fleas

The author feels sure that his readers will experience considerable satisfaction on learning that this is the last of many fallacies by which he has been "had" by his friends! All he can plead is that his belief is at least a very popular one, and consequently he is very pleased to be able to quote from such a convincing source in refutation of the error. On page 12 of the fifth edition of the "Illustrated Official Guide to the London Zoological Society's Gardens in Regent's Park," by Dr. P. Chalmers Mitchell, M.A., D.Sc., the Secretary to the Society, he says: "It may be interesting to note that, in spite of an almost universal belief, monkeys are extremely rarely infested by fleas. No doubt their own habits protect them, as fleas would have small chance of escaping the attentions of the friends of their hosts; but in most cases, a monkey searching another monkey is not hunting for fleas, but for little masses of a salt-tasting secretion which occasionally exudes from the pores of the skin."

(b) BIRDS

That Kingfishers have Nests similar to the majority of Birds

"Very early in the year the kingfisher prepares its nest, which is at the end of a tunnel bored by itself in a bank, and therein six or eight white, glossy, translucent eggs are

laid, sometimes on the bare soil, but often on the fishbones which, being indigestible, are thrown up in pellets by the birds, and in any case, before incubation is completed ; these rejectamenta accumulate so as to form a pretty cup-shaped structure that increases in bulk after the young are hatched, but, mixed with their fluid excrements and with the decaying fishes brought for their support, soon become a dripping, fœtid mass.

" The kingfisher is the subject of a variety of legends and superstitions : its dried body is said to avert thunderbolts ; and, if kept in a wardrobe, to preserve from moths the woollen stuffs therein laid ; or, hung by a thread to the ceiling of a chamber, to point with its bill to the quarter whence the wind blows."—Prof. A. Newton, F.R.S., in " A Dictionary of Birds."

That there is no such thing as Pigeon's Milk

There are certain glands in the crop of a pigeon which secrete a thick, white fluid, with which the young are partially fed.

Mr. Edward Jesse considers that the crop is gradually thickened, and the glands enlarged, during the period of incubation in most birds, just as the milk glands are prepared during gestation in mammalia ; and Mr. Gulliver has shown that a process like that which takes place in the crop of pigeons has been discovered in the female crocodile, reptiles and birds being closely allied.

That the Nightingale Sings at Night only

Prof. Alfred Newton, F.R.S., in " A Dictionary of Birds," says : " This bird is justly celebrated beyond all others by European writers for the admirable vocal powers which, during some weeks after its return from its winter quarters in the South, it exercises *at all hours of the day and night.* It is the cock alone that sings."

Daulias luscinia or *Daulias vera* is the nightingale that is common in Great Britain, and it is usually heard at night. The serenade is the love-song of the male, which ceases as soon as his propensities are gratified, as is usual with birds.

" It is a vulgar error to suppose that the song of the nightingale is melancholy, and that it only sings by night. There are two varieties of the nightingale : one which sings

both in the night and day, and one which sings in the day only."—M. Wichterich, of Bonn.

Shakespeare appears to have been in error on this point, as the following quotation shows :—

"The nightingale, if she should sing by day,
When every goose is cackling, would be thought
No better a musician than the wren."

—*Merchant of Venice*, act v., l. 104.

Notice also that he wrongly ascribes the song to the female.

That the Goat-sucker sucks Goats

This is a *very* old fallacy, for Aristotle speaks of it thus : "Flying upon the goats, it sucks them, whence its name."

On this subject Prof. Alfred Newton, F.R.S., in "A Dictionary of Birds," remarks :—"The goat-sucker is a bird from ancient times absurdly believed to have the habit implied by the common name it bears in many European tongues besides our own, as testified by the Greek, Latin, Spanish, French, and German names. Its prey consists chiefly of moths and cockchafers."

Its scientific name is *Caprimulgus europœus* (Linn.), but should you not recognise it under this title, perhaps you may recognise one or more of the following names by which it is also known :—Night-jar, night-swallow, night-churr, tree-jar, goat-owl, fern-owl, churn-owl, and wheel-bird, the last from the bird's song resembling the noise made by a spinning-wheel in motion. It is one of the few birds that absolutely make no nest, but lays its eggs on the ground.

Prof. T. Rymer Jones, F.R.S., suggests that the fallacy arose from the circumstance of the birds frequenting fields where goats and sheep are herded, in pursuit of the insects that are attracted by the presence of those animals.

That Birds of Paradise neither have Feet nor Wings

"The birds were so named by the Dutch voyagers in allusion to the brilliancy of their plumage and to the current belief that, possessing neither wings nor feet, they passed their lives in the air, sustained on their ample plumes, resting only at long intervals suspended from the branches of lofty trees by the wire-like feathers of the tail, and drawing their food from the dews of heaven and the nectar of flowers. Such stories obtained credence from the fact that so late as

the year 1760, when Linnæus named a particular species *Paradisea apoda,* or "footless," no perfect specimen had been seen in Europe, the natives who sold their skins to coast traders invariably depriving them of feet and wings." —"Encyclopædia Britannica."

Besides the absence of legs and wings, the following wonders were once credited of this bird:—That the egg was laid in air, and there hatched by the male in a pocket in his body; that it never touched the ground during any period of its existence. The Indians also believe that the leader or king of the birds of paradise is black with red spots, and that he soars away with the rest of the flock, which, however, never quits him, but settles where he does.

All the varieties are indigenous to New Guinea and the neighbouring islands. There are about forty species.

That Cutting a Parrot's Tongue (or the Tongue of any Bird capable of Talking) with a Sixpence, or keeping it without Water, makes it Talk Better

"Depriving the parrot of water, or cutting its tongue, will not enhance its power of talking. Both acts are brutal inhumanity."—Dr. John Torry, M.R.C.P.

"The cutting of the tongues of birds, or depriving them of water, under an impression that such ill-treatment makes good talkers, is not only an act of cruelty, but it is also a fallacy. The law protects domestic birds, and persons guilty of cruelty to them may be prosecuted."—John Colam, Sec. to the Royal Soc. for the Prevention of Cruelty to Animals.

That the Pelican opens its Breast with its Bill and Feeds its Young with the Blood that Exudes

"To his good friends thus wide I'll ope my arms;
And like the kind life rendering pelican,
Repast them with my blood."

Shakespeare—*Hamlet.*

Shakespeare's wonted accuracy forsook him for once!

Prof. Alfred Newton, F.R.S., has the following note on the matter in "A Dictionary of Birds":—

"It may be necessary to state that there is no foundation for the venerable legend of the pelican feeding her young with blood from her own breast, which has given it an important place in ecclesiastical heraldry, except that, as Mr. Bartlett has suggested (Proc. Zool. Society, 1869, page

146), the curious bloody secretion ejected from the mouth of the flamingo may have given rise to the belief, through that bird having been mistaken for the 'pelican of the wilderness.'"

John Timbs, F.S.A., in his "Popular Errors," page 104, gives the following note, which agrees with the explanation given in "The Royal Nat. Hist." :—

"By reference to the actual economy of the pelican, we find that in feeding the nestlings—and the male is said to supply the wants of the female, when she is sitting, in the same manner—the under mandible is pressed against the neck and breast, to assist the bird in disgorging the contents of the capacious pouch; and during this action the red nail of the upper mandible would appear to come in contact with the breast, thus laying the foundation, in all probability, for the fable that the pelican nourishes her young with her blood, and for the attitude in which the imagination of painters has placed the bird in books of emblems, etc., with the blood spurting from the wounds made by the terminating nail of the upper mandible into the gaping mouths of her offspring."

That this is an old-standing fallacy is seen from the fact that it was referred to by John Skelton, the Poet Laureate, who died in 1529, in the following words :—

"Than sayd the Pellycane,
When my byrdts be slayne,
With my bloude I them reuyue [revive].
Scripture doth record,
The same dyd our Lord,
And rose from deth to lyue."

—"Armoury of Birdts."

That Humming-birds Feed only on the Nectar of Flowers

"The tongue of the humming-bird consists of two cylindrical tubes, tapering towards the points, and forming two sheaths which contain the extensible portion, and are capable of separation, thereby facilitating the extraction of honey from the nectaries of flowers, and with it what is of far greater importance for the birds' sustenance, the small insects that have been attracted to feed upon the honey.

"The food of the humming-bird consists mainly of insects, more commonly gathered in the manner already

described, from the flowers they visit; but, according to Mr. Wallace, there are many species which he has never seen so occupied, and the 'hermits' especially seem to live almost entirely upon the insects which are found on the lower surfaces of leaves, over which they will closely pass their bill, balancing themselves the while vertically in the air. The same excellent observer also remarks that even among the common flower-frequenting species he has found the alimentary canal entirely filled with insects, and very rarely a trace of honey. It is this fact doubtless that has hindered almost all attempts at keeping them in confinement for any length of time—nearly everyone making the experiment having fed his captives only with syrup, which is wholly insufficient as sustenance, and seeing, therefore, the wretched creatures gradually sink into inanition and die of hunger."—Prof. Alf. Newton, F.R.S., in "A Dictionary of Birds."

Prof. T. Rymer Jones, F.R.S., also says they feed on small flies and insects, as well as nectar.

That Ostriches cannot Jump or Swim, and that they use their Wings as Organs of Flight

Mr. S. C. C. Schreiner, who has had a large experience of South Africa, attacked this fallacy a few years ago in the *Zoologist*. He states that an ostrich can not only leap over a low fence and across a narrow sluit (gulley or ditch), but that it can go over a 5-ft. wall, especially if startled. Also that it can swim, and that in running its wings are not used as in flight, but they have a balancing action, aiding the bird to turn abruptly. It is incorrect to say the cock-bird alone sits, or that during the day the eggs are left to the heat of the sun. The hen sits during the day and the cock at night. Darwin, in his "Voyage of a Naturalist," page 190, refers to the use of the wings as sails by the South American ostriches, and the author can confirm this use of them in South Africa. They are not flapped, but held out sideways.

That the Scarlet Ibis is the Specie which the ancient Egyptians Worshipped

The scarlet ibis *(Eudocimus ruber)* is a native of sub-tropical America, and, being a very handsome bird, it is erroneously concluded, when this specie is seen alongside the

historical one, that it is the one the Egyptians held in veneration. The sacred ibis *(Ibis religiosa)* is a native of Africa, and is a white and black bird, with black head, bill, and feet.

That the common Goose-teal, or Cotton-teal, cannot Walk or Stand

Mr. Finn's observations on this type of duck were reported briefly in the *University Correspondent* of August 28, 1897. The fallacy, which is said to be common among students of Indian ornithology, has originated from the fact that the bird when disturbed invariably describes a loose shuffling motion over the ground, which cannot be described as either walking or flying. Mr. Finn concluded that the bird is, like other birds, capable of walking, and that the peculiar motion observed is the result of either weakness or fright. Both the illustrations which we have before us show the bird with well-developed legs, and feet like those of the common duck.

That the Cuckoo sucks little Birds' Eggs to Keep its Voice Clear

Mr. W. Percival Westell wrote as follows to the *Daily Mail* on September 17, 1898:—

"THE PLAGUE OF INSECTS.

"To the Editor of the *Daily Mail.*

"I read the paragraph in the *Daily Mail re* the plague of caterpillars at Hove with a feeling of regret and pleasure —regret because it plainly shows that our British birds are rapidly decreasing—pleasure to know that yet another example has been forthcoming that agriculturists and the like must suffer if they will persist in wantonly destroying the antidote which nature has supplied, *i.e.* a bird's beak. Even the much-abused house sparrow is a deadly enemy to caterpillars, but he is slain in thousands daily. Probably the cuckoo eats as many caterpillars as any bird, but he is shot by many *because of a ridiculous fable that he sucks little birds' eggs to keep his voice clear,* and on account of his supposed uselessness.

"This is not the only complaint of insect pests which will be heard while this destruction is carried on among our feathered pets; it is but the forerunner of many similar instances. There has been an enormous number of flies during this summer—people wonder why; the answer may

possibly be because of the decrease in the number of swallows.

"Before it is too late the Board of Agriculture or some other influential body should see that protection orders are issued immediately, and the bird laws of our country are strengthened to a very much greater extent.

"W. PERCIVAL WESTELL."

(c) INSECTS

That a Small House-fly is a House-fly that is not full grown, and hence if it lives that it will grow Larger

The house-fly belongs to the division *Diptera* [Gr. two wings] of insects, and all insects in this group (and some other groups, such as *Hymenoptera* (bees and wasps) and *Lepidoptera* [Gr. scaly-wings], which includes butterflies and moths, emerge full-grown from the pupa or chrysalis stage, though, of course, in the case of large moths their wings are a bit crumpled at first.

The life-history of the silkworm moth *(Bombyx Mori)* may be taken as typical of the life-histories of the above groups: the eggs laid by the female moth on mulberry leaves produce minute black silk-worms (technically known as larvæ), which immediately start feeding on the mulberry leaves and growing. This lasts from six to eight weeks, and they shed their skins several times during the process. When full-grown they are about two inches long, and of a dirty green colour.

They then spin their cocoons, enveloping themselves in the silk, the length of the fibre being about 1,500 ft. All moths do not have a fibrous covering, but a brown chitenous one, during their quiescent or pupa stage, and some pupa have no covering. Thus the worm, if *not* trodden upon, will turn into a full-grown moth, which lays eggs, and so we have the complete cycle consisting of four stages or acts.

That Cuckoo-spit is produced by the Cuckoo

Cuckoo-spit is the white frothy exudation, for the purposes of protection, of the larvæ of the *Cicada spumaria,* or, according to Brockett, the *Tellicona spumaria,* which is seen at the axillæ of the leaves and branches of plants, particularly lavender and rosemary, early in the spring.

Frog-spit and toad-spit are other names for this spume; frog-spit, because the insect which develops from the larvæ is called the frog-hopper, as it resembles a frog in colour and shape, and hops well, though, of course, it is *not* a frog, but a true insect.

That Soy is made from "Black-beetles"

"Sailors have a notion that soy [a kind of sauce prepared in the East from the soy-bean *(Soja hispida)*] is made from cockroaches; and, however absurd the belief may appear, the reason for it is worthy of investigation.

"The Chinese at Canton have a large soy manufactory, and they are particularly solicitous to obtain cockroaches from ships, from which circumstance sailors immediately conclude that it is for the purpose of making soy from them. But it is better established that cockroaches are used by the Chinese as a bait in fishing. The infusion of cockroaches is also used in medicine, and Mr. Webster, surgeon of H.M.S. *Chanticleer,* states that common salt and water, saturated with the juices of the cockroach, has all the odour, and some of the flavour and qualities, of soy; so that the sailors' notion, after all, may not be far from the truth."—J. Timbs, F.S.A., "Popular Errors."

That Caterpillars will Eat any kind of Green Stuff

The people who started this belief must be those who fitted green spectacles to their horses, and then gave them wood shavings and straw to eat! Our entomological adviser informs us that while some larvæ, as they are technically called will eat one or two kinds of green stuff [*e.g.* the Privet Hawk Moth *(Sphinx legustri)* will feed on both privet and lilac], many will feed only on one in the natural state,* as is the case with the larvæ of the Clifden Nonpareil *(Cotacala Fraxini)*, which will eat only poplar leaves, and the Eyed Hawk Moth *(Smerinthus Ocellatus)*, which eats only willow leaves. It is very remarkable that one species, the scarce Marveil-du-Jour *(Dipthera Orion)*, are found only on birch one year, and the larvæ that next follow in the cycle of life-changes are found only on oak. Then the *third* series of larvæ completes the food cycle, for they will be found only on birch.

* In captivity they might eat a very closely-allied plant.

That "Black-beetles" are Black, and that they are Beetles.

This is very discomforting, and we may expect to hear that negroes are not black, that buttercups do not make butter, nor grasshoppers grass, and that, as some audaciously hint—even the Prince of Darkness himself is not as black as he is painted.

The other vulgar name of the "black-beetle" is cockroach, though we believe cockroaches are unconnected with the fishroach! Their technical name is *Periplaneta* (from their nocturnal habits). They are both of a dark brown colour, and not true beetles *(Coleoptera)*, but belong to a less modified group of insects, including locusts and grasshoppers, known as *Orthoptera*. A true beetle is shown in the plate facing, which gives the metamorphoses of some of the insects referred to in this section.

That Dragon-flies Sting

In this case we were almost going to give what has been unkindly—and in many cases wrongly—termed "a woman's reason," by saying, "They don't sting because they don't sting." But we will relent. Once, when Henry IV. of France was paying a visit to a small provincial town, he was met at the gates by the civic authorities, the chief of whom stated that they had omitted to fire a royal salute for a hundred excellent reasons, the first being that their town did not possess any cannon. His Majesty was so satisfied with the first reason that he excused them stating the remaining ninety-nine. No doubt there are a hundred good reasons why the dragon-fly does not sting, but we hope our readers will follow the royal example and be satisfied with the first, viz. that the dragon-fly *has no sting!*

The dragon-fly *(Libellula)* belongs to the order *Neuroptera*, and none of the insects of this order has any sting.

That Bees have Tubular Probosces, carry Honey on their Legs and collect Beeswax from Flowers

The following is an extract from the article in "Encyclopædia Britannica" by John Hunter, late Hon. Sec. of the British Bee-Keepers' Association:—

"The proboscis or trunk of the honey-bee is not tubular, as Swammerdam had supposed, but solid throughout, and the minute depression at its extremity is not the aperture of

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METAMORPHOSES OF INSECTS.

1. DRAGON FLY (*Libellula depressa*). 2. LARVA OF DITTO. 3. INSECT EMERGING FROM NYMPH. 4. BUTTERFLY (*Vanessa io*). 5. CATERPILLAR OF DITTO. 6. CHRYSALIS OF DITTO. 7. BEETLE (*Dytiscus marginalis*). 8. LARVA OF DITTO 9. NYMPH OF DITTO.

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any canal through which liquids can be absorbed. The proboscis of the bee performs strictly the office of a tongue, not that of a tube for suction; for when it takes up honey, or any other fluid aliment, the under or upper surfaces are more immediately applied to it, and rolled from side to side, and the bee thus licks up what adheres to it, while the extremity of the proboscis is frequently not applied at all to the substance taken up.

"The bee has two stomachs. The first is a large transparent membranous bag, pointed in front and swelling out into two pouches behind. It performs an office in some respects analogous to that of the crop in birds; for it receives and retains for a time the fluid of the nectaries, which does not appear to differ in any respect from honey. The coats of this reservoir are muscular, which means it is capable of throwing up the honey into the mouth, so that it is regurgitated into the honey-cells, or imparted to other bees.

"The second stomach is for the purpose of digestion.

"The bees, by means of the pencil of hair which grows on the tarsi, first collect a certain quantity of pollen, and then knead it together into a ball, and place it in the space situated at the middle joint or tibia of the hinder leg, which has been called the basket."

With regard to the wax, Dr. E. Lankester, M.D., F.R.S., says: "It is an erroneous notion to suppose that the bee collects wax from flowers. It is secreted, and makes its appearance in little scales, which exude between the segments on the under side of the abdomen, eight scales being visible in each bee."

The error has probably arisen by confusing bee-bread with beeswax. Bees collect pollen from flowers, and work it up into a stiff paste with their hind legs. This is then called bee-bread, because it is used by the bees to feed their larvæ.

Shakespeare went wrong on the habits of bees also, for in the Second Part of *King Henry IV.*, act. iv., sc. 4, we find the King saying:

"When, like the bee, culling from every flower
The virtuous sweets;
Our thighs pack'd with wax, our mouths with honey,
We bring it to the hive."

See also "Ants, Bees, and Wasps," by Lord Avebury, F.R.S.

That the May-fly's total Life lasts only One Day

Prof. T. Rymer-Jones, F.R.S., says: "These insects have received their name *(Ephemera)* from the shortness of their existence in their perfect state, which is, indeed, so brief that the same evening sun which sees their birth generally witnesses their destruction. Their life, however, in the earlier stages of their growth is of much longer duration. In their larval state they live in the water, lurking under stones, or residing in little holes that they excavate in the banks of the stream. When about to undergo their last transformation they leave the water, and cast off their pupa covering; but, by a remarkable exception to other insects, they are still covered by a thin pellicle, which gives them a dull appearance. In this condition they are known to the angler as '*duns*.' In a short time, however, they cast off this temporary *déshabille,* leaving it upon trees or walls, or even the clothes of the passer-by, and present themselves in the full livery of the perfect insect, in which garb they constitute the '*drake*' of the fly-fisher."

"The May-fly," says Lord Avebury, F.R.S., "is celebrated as living only for a day, and has given its name to all things short-lived. The statement usually made is, indeed, very misleading, for in its larval condition the *Ephemera* lives for weeks."—"Beauties of Nature," p. 57.

It may be that the expression "lives only for a day" is sometimes used in a slack way by people who do know the true state of affairs; but this being heard by others whose entomological knowledge is very limited, would be repeated by them in an entirely erroneous manner, and thus popular fallacies arise. Moral: Do not use loose, indefinite, and ambiguous language! In this case some entomologist is to blame, for the Greek word *ephemeros* means "living but a day."

That Earwigs have a particular predilection for getting into the Ears of Human Beings

"Earwig, a name sanctioned by common error, applied under various modifications in different languages (*e.g.* Auricularia, Perce-oreille, Ohr-wurm, Oorblazer, Ormask, Oerentvist, Gusano del oido) to the somewhat osculant insects comprised in the old Linnæan genus *Forficula*—an error

arising in the first instance probably from their invariable habit of secreting themselves in any cavity (instances being known of the common species hiding itself in the ear of a person sleeping in the open air), and strengthened by the popular exaggerated idea of the strength attributes of the anal forceps peculiar to these insects.

"The most common specie is Forficula auricularia.

"The forceps have been observed to be used in arranging the wings, and are also supposed to be used as weapons of offence and defence, though it is difficult to understand how they can be any practical assistance for either purpose."—Ed. Caldwell Rye, "Ency. Brit."

The derivation of the word is doubtful; some say it is from the shape of the wings when they are open. "J.R.S.C.," in "Chatterbox," No. xxiii., for 1894, says he has never known one get into the ear, although he has had acquaintance with thousands of earwigs.

Lastly, the fact that the majority of earwigs are, in the normal state, certainly eaters of *vegetable* matter, makes it unlikely that they would by preference house themselves in an animal's (man's) ear, especially as the ear contains bitter wax, for the purpose of repelling insects which may get in by chance.

Dr. Brewer says the insect received its name because the hind wings resemble in shape the human ear, and that the name has engendered the notion that these insects are apt to get into our ears.

That Freezing Kills all forms of Insect Life

To the author's inquiry on this point, Mr. S. L. Mosley, of the Huddersfield Museum, replied that any caterpillar which normally passes the winter can be frozen hard and live. Miss Ormerod had some daddy-long-legs' grubs frozen at Kew till they would break, and those not broken lived.

The author remembers seeing a humorouse picture in *Punch*, or a similar paper, about 1885, when the subject of freezing meat was prominently before the public. The statement was that even human beings might be frozen without harm, and that this would be a convenient way of dealing with children on a railway journey. The picture represented a family leaving by train for the seaside, and Paterfamilias says to the nurse: "Have you seen all the

luggage into the van?" "Yes, sir." "And are all the children frozen?" "Yes, sir."

That the "Ants' Eggs" with which Gold Fish are Fed are the Eggs of Ants

It is true boa-constrictors swallow animals much larger in cross section than their own bodies, still, for all this, the fact that these so-called ants' eggs are as large as most ants should make us pause to inquire how so small a creature comes to lay an egg as large as itself; and, if it were true, it would well repay some patient experimental biologist to put the common barndoor hen through a similar course of training!

The life-history of ants is similar to that of silk-worms. Starting from the true egg (which is very small) it, on being hatched, yields a tiny grub. These are nursed and fed by the females and neuters, the latter forming the majority of the inhabitants of a nest. After attaining full size, the grub spins a white cocoon around itself and changes into a pupa. It is these pupæ which are sold as ants' "eggs." The pupæ in the natural course of events change into full-grown ants. The females of these lay eggs, and thus the cycle is completed.

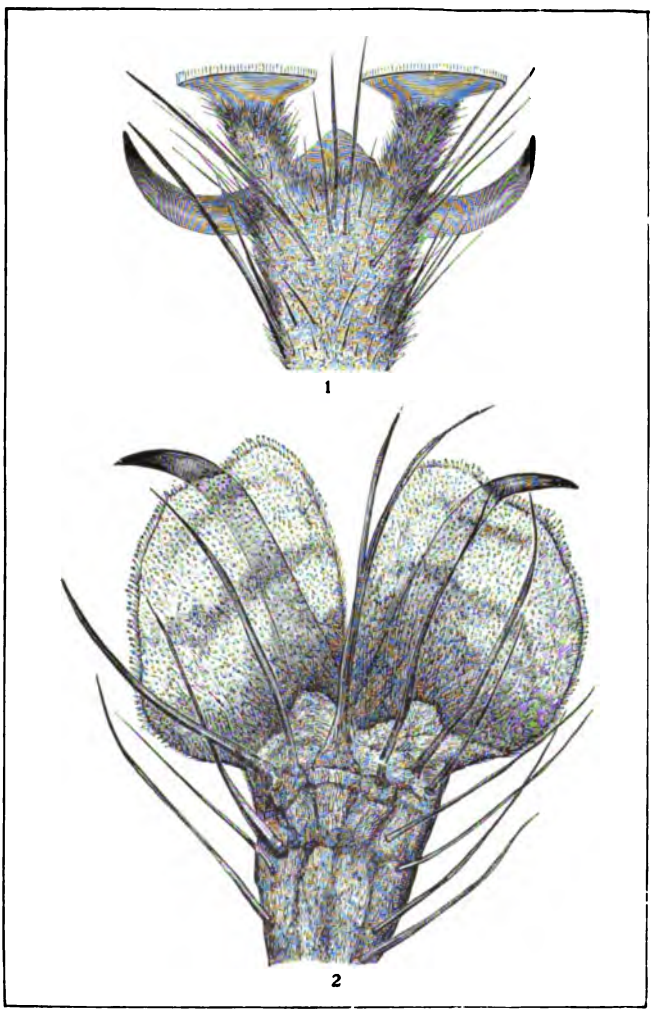
That Ladybirds eat "Blight" or Greenfly (Aphides)

This erroneous idea is closely allied to that of moths eating clothes; for what happens, in the present case, is that the ladybird lays eggs; these produce small larvæ with six short legs, and having an appetite for aphides as insatiable as that of a trout for May flies.

Ants, curiously enough, are most gentle with the aphides, and drink the "honey-dew" secreted by them. They are sometimes called the "cows" of ants.

That the Common House-fly has Suckers at the Extremities of its Legs which enable it to Walk on a Ceiling

It has been said that no house should be without a microscope. Those who have such an interesting and instructive instrument can easily check the fallacy for themselves, others will need to see an enlarged drawing of a domestic fly. One such is given under "house-fly" in the "Century Dictionary." By either of these methods it will be seen that each foot is formed of a pair of hooks and a pair of flaps.



1. A FLY'S FOOT AS FASTENED TO THE CEILING BY THE TINY HAIR-LIKE BODIES ON THE PADS.

2. THE FOOT OF THE HOUSE-FLY, SHOWING THE PADS COVERED WITH MINUTE HAIRS.

That the Locusts referred to by St. Mark, in chapter i., v. 6, were the Bean-pods of the Locust Tree

The quotation is, " . . . . and he did eat locusts and wild honey." St. Matthew, chapter iii., v. 4, says, " . . . . and his *meat* was locusts and wild honey," which tends to show that the insect and not a member of the vegetable kingdom is meant. This receives further support from Leviticus, chapter xi., v. 21 and 22, where we read, " Yet these may ye eat of all winged creeping things that go upon all four, which have legs above their feet, to leap withal upon the earth ; even these ye may eat ; the locust after its kind, and the bald locust after its kind, and the cricket after its kind, and the grasshopper after its kind." They are still eaten in the East, being dried, salted, ground into a powder and made into cakes. The yellow ones, which are common in South Africa, when boiled turn red and taste somewhat like shrimps. They are eaten also by the Hottentots (South Africa), and Dr. Livingstone approved of them as an article of diet.

That Insects can pass through the Ear into the Brain of a Child and remain alive in the Head

If this were possible, it probably would be pretty terrible for the unfortunate child. On the other hand, if the insect were, as we may reasonably suppose, used to the normal amount of fresh air and sunshine that his kind enjoys, he would find the inside of a child's head anything but a pleasant abode, and he would be as much to be pitied as the child. The *Lancet* dealt briefly with this fallacy in September, 1903, as the result of someone writing to them, mentioning an alleged case of a " blackbeetle " having entered a child's ear, and causing so much suffering that the Home Secretary was appealed to for his permission for a fatal dose of an opiate to be administered. The *Lancet* remarked that this is a good instance of stories the details of which are so obviously absurd that the mere invention of them becomes remarkable.

(d) FISH

Fallacies connected with the Herring

More nonsense has been uttered about the herring than about all the other fish, flesh, and fowl in creation. The

exposure of these fallacies has been thus ably handled in *The Times*:—

"If Sir Thomas Browne were now alive, he might write another volume on 'Vulgar Errors' all about the herring; for it illustrates absurdities of almost every kind—scientific, historical, commercial, and political. It is an imposing little animal that has befooled us for a couple of centuries. We have been eating him ever so long; but all this time we know nothing about the little vagrant, and in books of recognised authority we find statements with regard to its habits that are quite as apocryphal as the old story which Gilbert White contests so vehemently about swallows in the winter migrating to the bottom of rivers, where they spend their time in a torpid slumber. The naturalists declare that the herring goes to the Arctic seas to spawn, and there remains for months afterwards in order to recruit its strength; we might cite works of high authority in which that tradition is to this very day and in latest editions handed down. It is all nonsense: the herring never leaves our shores. Next to the fictitious gossip regarding the migrations of this little fish are the curious stories of the wealth which it has created, and of its vast importance to human welfare. We hear of Amsterdam being built on herring-bones, and that every fifth inhabitant of Holland was at one time engaged in the herring-fishery. This, too, is a ridiculous hoax. Amsterdam is built on something far more precious than herring-bones; and it has been calculated that if the tales current with regard to the Dutch trade in herrings be correct, then every able-bodied man in the country must have been engaged in the business.

"Our herring-fisheries are now a valuable property, in which altogether from two to three millions of money are sunk, about half a million being sunk in boats, nets, and lines alone. In many parts of Scotland a hundred herrings can be purchased for sixpence. The Scotch-cured herrings have a large sale on the Continent, and in some places are even superseding the Dutch."

That Flying Fish fly in the sense that they flap their fins like Birds do their wings

This fallacy—if it be one—is one on which the author confesses he is not convinced! He will give two authoritative quotations, and then his own views.

The "Standard Natural History," vol. iii., page 175, says:—"The aërial flight is not strictly entitled to the name, for the pectoral fins are not used in active progression, but are simply employed as parachutes. *The fins are—more or less—vibrated*, but it is rather by an opposition to the air than by the volition of the animal."

Prof. T. Rymer Jones, F.R.S. ("Animal Creation," page 250), says:—". . . . their wings only serve them as a parachute. . . . The greatest length of time they remain in the air is thirty-two seconds, and their largest flight from 200 to 250 yards." ". . . . or rushing from the water with an audible *rustling sound* as they spread out their large pellucid wings or fins in a new element. . . ."

Both these writers refer to the motion of the fins. Both liken the action of the fins to that of a parachute. It is true that a flag or piece of paper, held by one edge, in a wind makes a considerable amount of motion and noise, and it is no doubt this action which is meant by the first writer; but for this action to take place, the wind must be rushing past the flag or paper. Hence the relative motions of the fish and the air must be in opposite directions. If the fins are not moved by the fish, the only thing which can carry it dead against the wind, or the still air, must be its momentum, due to its spring out of the water. But the fish is a small one, and hence it is very difficult to believe that its momentum is enough to carry it against the wind for so great a distance as 200 yards, or for so long a time as thirty-two seconds. The action is more conceivable if we imagine that the fish darts out of the water in the direction of a strong wind, but "Ency. Brit." says:—"Generally the distance is longer when the fishes fly against, than with, or at an angle to, the wind."

As regards the parachute action, this, too, seems more likely if we imagine the fish to move *with* the wind, for otherwise the fish would have to glide gradually downwards (like sliding down an inclined plane of air); but the author has seen them fly, and they keep *parallel* to the surface and only a few inches above it. To do such a gliding action and move 200 yards horizontally would mean starting far higher than they do start. For a body to move horizontally for 200 yards (sometimes against the air or wind) without any work (in the technical sense) being done

certainly seems a paradox, though perhaps it is not more so than the action of a cat turning completely over in a fall of 15 inches. In this case the difficulty is to see what the cat pushes against in order to get the turning movement!

"Ency. Brit." admits there is a great diversity of opinion among observers as regards the mode of flight, but says the most reliable agree that flying fish are unable to move their fins in the manner of bats or birds, or change voluntarily the direction of their flight.

That Deep-sea Fish are very strongly built in order to resist the great pressure due to the sea water

The principle here involved is very like that in the case of bodies which are popularly supposed to float after sinking to a certain depth (q.v.). Deep-sea fish are, of course, modified to suit their peculiar environment, but this modification does not consist in greatly strengthening their bodies, because it is not necessary. On the contrary, their osseous and muscular systems are very feebly developed, the bones having a fibrous, fissured, and cavernous texture. The pressure is very great, but it acts not only inside and outside of the fish, as a whole, but inside and outside of each cell or particle of which the fish is constructed, and, consequently, there is no more tendency to crush the fish than there is for our bodies to be crushed by the atmospheric pressure, amounting to the very respectable intensity of 15 lb. per square inch. If, however, these fish were suddenly taken down into still greater depth, then they would suffer from the increased pressure, on account of there not being time for the balancing effect to take place. When they are suddenly brought up from their natural depths to less ones, they suffer also, for again there is a want of balance of pressure. In this case the pressure of the air and gases inside them is greater than the reduced pressure outside, and, as a result, some of the tissues are ruptured; but were they very slowly raised, then probably this rupturing would not occur. The action is similar to that experienced by divers, or men who work in compressed air in the construction of tunnels. If they are not careful to come out of the pressure slowly (which they are enabled to do by means of the air-lock) they are very liable to suffer from the troublesome complaint known as "compressed-air sickness."

That true Whitebait is a particular species of Fish which never grows large

This was for a long time a knotty point even with naturalists, as will be seen by the following quotation from the "Century Dictionary":—

"The identity of whitebait has been much discussed and disputed. They have been supposed to be a distinct species, named *Clupea alba*, and even placed in a genus framed for their reception as *Rogenia alba*. They have been more generally recognised as the fry of certain clupeoids, as the sprat *(Clupea sprattus)*, the herring *(C. harengus)*, and the shad. But careful examinations of great quantities of whitebait, made in different localities at different times, have shown these opinions to be more or less erroneous. Whitebait consists, in fact, of the fry of several different clupeoid fishes, mainly the sprat and the herring, with occasionally a small percentage of yet other fishes; and the relative quantity of the different species represented varies, moreover, according to season and locality."

That the Numbers of an Individual Species depend on its Powers of Propagation

The foot-note on page 190 of "A Naturalist's Voyage Round the World," by Chas. Darwin, F.R.S. (published by John Murray), is as follows:—

"I was surprised to find on counting the eggs of a large white Doris (this sea-slug was 3½ inches long), how extraordinarily numerous they were. From two to five eggs (each three-thousandths of an inch in diameter) were contained in a spherical little case. These were arranged two deep in transverse rows forming a ribbon. The ribbon adhered by its edge to the rock in an oval spire. One which I found measured nearly twenty inches in length and half in breadth. By counting how many balls were contained in a tenth of an inch in the row, and how many rows in an equal length of the ribbon, on the most moderate computation there were 600,000 eggs. Yet this Doris was certainly not very common; although I was often searching under the stones, I saw only seven individuals. *No fallacy is more common with naturalists, than that the numbers of an individual species depend on its powers of propagation.*"

(e) VARIOUS

That a Snake's Bifid Tongue is what it Stings, or Poisons, with

Strictly speaking a snake *bites*. (Bees, wasps, hornets, etc., sting.)

Venomous snakes, or vipers (a contraction of vivipares), have one long curved fang on each side of the upper jaw, somewhat in the same position as the canine teeth of a cat. This long tooth forms a very small tube which is in communication with the poison gland, and the tooth may be fixed, or hinged; in the latter case it can be directed backwards when not wanted for immediate use.

That it can Rain Frogs.

It is necessary for a frog, not to "keep his powder dry," but to keep his skin moist, in order that it may be functional. Hence frogs are only found in moist places, and where water is close at hand. Sometimes they hide from the sun under stones and bits of turf, and occasionally come out in great numbers after a shower of rain, and this has given rise to the tales about it "raining frogs."

The *Globe*, of July 20, 1898, had the following article on the subject of this fallacy:—

SHOWERS OF FROGS.

"Sea-serpents have been scarce in recent years, and the giant gooseberry is a tradition merely; but the shower of frogs is a hardy annual which may be looked for with confidence in July whenever the season is favourable. A period of heat and drought is usually followed by a sharp downpour of rain; and, lo, what was sunbaked soil on Monday becomes on Tuesday a moist, soft surface on which myriads of tiny frogs or toads are leaping or scrambling about. The average observer is as much puzzled to account for their presence as the king who harassed his royal brain to discover how the apple got inside the dumpling. If he is of a severely scientific turn of mind he will argue that sudden showers in July argue atmospheric disturbances; that atmospheric disturbances generate waterspouts; and that waterspouts carry small bodies into the air: therefore, the frogs on the croquet lawn must have been carelessly spilt there by a waterspout.

"This sapient conclusion affords material for a letter to the local newspaper, whence the 'facts' are reproduced in the form of paragraphs which go round the Press of the world. In reality the little creatures have doffed their tadpole tails and have wandered in their thousands far afield. During the day a crack in the ground, a dead leaf, or an empty snail shell affords them shelter, and during the night they travel in pursuit of small insects. Then comes the shower of rain. It fills the cracks in the ground, washes away the dead leaves, and chokes up the snail shell with mud-splashes. But what matter? The little frogs are all over the place, revelling in the longed-for moisture; and the observer is taking notes of the 'phenomenon.' Hence our annual showers of frogs, carelessly dropped by water-spouts."

That a Scorpion, surrounded by Fire, will commit Suicide by Stinging itself to Death

"Though this well-known tale has been perpetually repeated, and has even been related to the present writer with some very minute and extraordinary details, it must be held to be merely a "traveller's story." Probably in some instances the poor scorpion has been burnt to death, and the well-known habit of these creatures, to raise the tail over the back and re-curve it so that the extremity touches the forepart of the cephalo-thorax, has led to the idea that it was stinging itself. Perhaps, under pain of scorching, there may have been convulsive efforts and movements of the highly nervous and sensitive tail in this position, and the point of the sting may even have been inserted between the articulation of the cephalo-thorax and abdomen, and what more would be wanting to make a wonder-loving traveller believe that it had really committed suicide?"—The Rev. O. Pickard Cambridge, M.A., "Ency. Brit."

Mr. C. E. Clark says that experiments have shown that a scorpion's poison has no effect upon itself, and that when one is placed in a test-tube, so that the sting cannot be used, and subjected to a moderate temperature (50° C.) it quickly dies. When the sun's rays are concentrated on a scorpion by means of a lens, it raises its tail and appears to try to remove the cause of irritation therewith, and then may die, in which case it is alleged to have committed

suicide, but in reality it has been killed by the heat to which it was exposed.

The "Century Dictionary" says :—" Some popular beliefs respecting scorpions have no foundation in fact, as when the creature is surrounded by fire, it stings itself to death rather than be burned, or that some fluid extracted from a scorpion will cure its sting."

" 'Tis true a scorpion's oil is said
To cure the wounds the vermin made."
—S. Butler's " Hudibras," III., ii., 1029.

That there is an Animal called a Salamander which lives in Fires

"The Salamander (*Salamandra*) belongs to the Urodela division of Amphibia.

"In the Middle Ages, in particular, it was believed that the creature had the shape of a man and lived in fire, the derivation (Greek) of the word meaning a man that lives in a chimney or fire.

"It is also believed that it is a sort of lizard which seeks the hottest fire to breed in, but quenches it with the extreme frigidity of its body. Pliny tells us he tried the experiment once, but the creature was soon burnt to a powder."—"Nat. Hist.," x., 67 ; xxix., 4.

Prof. T. Rymer-Jones, F.R.S., thus describes the animal :—" It is a harmless little reptile from six to eight inches long, thicker and fuller than a lizard, having a pale white belly, and one part of the skin exceedingly black, the other yellow, both of them very splendent and glistening, with a black line going down the back, having upon it many little spots like eggs. This ' daughter of fire, with a body of ice,' was formerly, and is still in some parts, believed to be able to brave the violence of fire, to pass through it unhurt and even to extinguish it in its course, with how much truth we leave our readers to judge. The young of the salamander are produced alive and fully formed ; they often differ from the mother by the possession of gills. The salamander inhabits Central Europe, and occurs in many parts of France."

Benvenuto Cellini, the Italian sculptor, says that he, as a child, saw a salamander, and his father gave him a good drubbing in order that his (*i.e.* Benny's) memory might be adequately impressed !

That if a Frog Spit on one a Wart results

This statement is no doubt first cousin to the following one: "If you hold a guinea-pig up by its tail its eyes will drop out"; though, by this, we do not mean to imply that a frog has no mouth wherewith to expectorate. Oh, no, he has plenty of mouth. Nor do we wish you to think that his mouth is dry like that of a parrot, but we *do* wish great emphasis to be given to the "if," and to point out that frogs are not given to such bad habits as the fallacy implies. The frog has a very flexible tongue (attached in front, with the free portion pointing down the gullet) which he is capable of darting out with extreme rapidity for the purpose of whisking up flies and other small insects, and there are glands in the front part of the upper jaw which secrete a sticky substance; this adheres to the tongue, and makes the insects adhere to it. We know several persons who often handle frogs' tongues, and yet have no warts.

That a Crocodile moves its Upper, instead of its Lower, Jaw, and that it has no Tongue

J. Gibson, in "Encyclopædia Britannica," says:—"The tongue is attached all round to the bottom of the mouth, and for this reason the crocodile was formerly supposed to be destitute of that organ.

"As in snakes, the lower jaw is attached to a process connected with, and extending backwards from, the skull, which greatly adds to the animal's gape, while giving it the appearance, in opening its mouth, of moving both jaws."

Prof. Rymer-Jones, F.R.S., says:—"The lower jaw is prolonged behind the base of the skull, and this structure causes the upper jaw to seem movable. The tongue is flat and free only at the very edge, so that these unwieldy animals have often been described as destitute of a tongue."

In the case of man we believe that many people think that they move both upper and lower jaws when eating, whereas, in reality, it is only the lower jaw which moves.

That Live Toads are found in solid Rocks and Coal

"M. Hérissant in 1777, Dr. Edwards in 1817, and Dr. Buckland in 1825-6, have proved by a series of experiments, that when deprived of air these animals speedily perish; but that they will survive for many months without food. Dr. Buckland's conclusions are that toads cannot live a

year excluded totally from atmospheric air, and from experiments made by enclosing these animals in cells cut in Oolite that they cannot in all probability survive two years entirely excluded from food."—"Zool. Journal," vol. v.

Unfortunately, none of the cases in which toads have been said to have been found in solid rock has ever been witnessed by an eminent naturalist; and those who have seen such apparent occurrences have been too interested in the toad itself, and so ready to believe the popular statement, that they have not examined the toad's environment sufficiently and carefully. The explanation of these cases is that there was some small passage communicating with a somewhat larger cavity in the stone. That the toad when small got into the cavity and could not get out again, but was able to live there because it was not cut off from the atmosphere, and probably obtained a small amount of nourishment in the form of insects which were able to enter by the narrow passage. Some even think that this passage could become nearly silted up with dirt, which would, of course, add to the delusion. When so confined, their respiration, according to Prof. T. Rymer-Jones, F.R.S., becomes extremely limited, and the contact of a very small quantity of air with the skin is sufficient to maintain their existence. Being shut up prevents, to a great extent, the loss of moisture from their bodies by evaporation. The last alleged case of the kind which we have seen was reported thus in the *Daily Mail*, of September 7, 1906:—

TOAD'S LONG SLEEP.

"Twenty years ago Mr. George Lewis built a house, with stone steps, at Stone, Staffordshire. This week the steps were removed, and imprisoned in the stonework was found a toad, in a comatose condition, but it soon revived when removed into sunshine. There can be nö doubt that the toad had lived twenty years in the hermetically-sealed chamber, as it was found in a cavity round which were stone and cement one foot in thickness and in perfect condition."

We think our readers will agree that the structure of steps is not likely to be hermetically tight even when a foot thick; and, in view of Dr. Buckland's careful experiments, we can only conclude that this is another case in which

there was some small passage by which the toad got in (possibly even in and out), and which passage got destroyed while the steps were being removed, as, of course, nobody was on the look-out for such an occurrence.

Ugliness of Animals.

Sir Thomas Browne observes:—"I cannot tell by what logic we call a toad, a bear, and an elephant, ugly, they being created in those outward shapes and figures which best express the actions of their inward forms, and having passed that general visitation of God, who saw that all that He had made was good, that is, comfortable to His will, which abhors deformity, and is the rule of order and beauty.

"One great cause of cruelty is teaching children to look upon the lower animals, unless they are 'very pretty,' with general dread and dislike. I can well remember how (says Mr. Rowell, in his 'Essay on the Beneficent Distribution of the Sense of Pain'), when a boy I have often picked up a caterpillar, and while admiring its beauty or form, been told to throw it down, and kill it; that it was a devil's ring, and if it got round my finger, I should never get it off again. Toads and other creatures are cruelly used by boys from an habitual dread and disgust of them; and it is often thought quite right to torture carnivorous animals, such as the polecat, weasel, etc., as a punishment for their cruel propensities. Children are sometimes taught to look upon such creatures as 'wicked things': they are told of the crafty spider that catches the poor flies, or of the cruel hawk which kills the pretty birds: such teaching is not only ridiculous, but in some degree impious, as arraigning the laws of nature."

That a Crab (or Lobster) is a Red Fish which Walks Backwards

The error with regard to the colour in this case has no doubt arisen from the fact that we usually see these crustaceans after they have been boiled, and then they are red; but in their natural state the common colour of a lobster might be described as a dark, dirty blue, while the colour of the common crab is brown. The edible crab of the United States is blue.

With regard to their forms of motion when on land or the sea-bottom, the crab, though capable of moving in

any direction, usually moves sideways, but the lobster forwards. When swimming, however, the lobster darts backwards with a series of jerks, each of which may carry it as far as twenty-five feet.

An amusing anecdote is told of the great French naturalist, Cuvier, in connection with this fallacy. The committee of the French Academy were at work on the Academy dictionary, and had just described a crab as "a small red fish which walks backwards," when Cuvier happened to go into the room. They read the definition to him, and he exclaimed:—"Perfect, gentlemen, but if you will give me leave, I will make one small observation in natural history. The crab is not a fish, it is not red, and it does not walk backwards. With these exceptions your definition is excellent."

In concluding this note, may we plead with those who cook this form of food, that they should reduce the pain to the creatures to a minimum by plunging them into *boiling* water, and *not* put them into cold water and then gradually heat it, as this is a particularly brutal procedure.

That a Snake, cut or hack it as you please, will never die till sunset

This used to be a very popular idea in South Africa some twenty years ago when the author was there. On the authority of "Notes and Queries," it is a common belief, too, in Northamptonshire, Cornwall, Devon and Somerset.

The discussion of this question depends on the definition of death. A dictionary definition is "a total and permanent cessation of all the vital functions." The "tripod of life" is the collective name given to the brain, heart, and lungs of an animal, and we believe that medical men consider a person to be dead when any one of these is destroyed. In spite, however, of all three being destroyed, the muscular system does not at once lose its power of reacting to a stimulus. That this is so is well proved by Galvani's classic experiment (said to have been performed previously by Swammerdam) of causing the hind legs (removed from the body, and therefore from the tripod of life) of a frog to move vigorously by stimulating them with a small current of electricity. It is probably an action similar to this which may occur sometimes in the case of a dead snake that causes the belief. Another reason is, that the external

appearance and attitude of a dead snake are much more like those of a live one than is the case with most other animals, say, a rabbit. The snake has no limbs to go limp, and its position when dead may be quite a normal one in life. Hence it is more difficult to decide whether it is dead or not. The author has shot and otherwise killed snakes in South Africa and the United States, and in the case of those which he watched carefully with the above statement in mind, he is confident the snakes were dead long before sundown.

That Palms, and other Tropical Plants, then Birds, and, lastly, Man, take possession of Coral Islets as soon as formed in the Pacific

No less an authority than Darwin refutes this fallacy in his "Voyage of a Naturalist" (page 10 of ed. pub. by John Murray, 1897), by saying:—"The often repeated description of the stately palm and other noble tropical plants, then birds, and lastly, man, taking possession of the coral islets as soon as formed in the Pacific, is probably not correct. I fear it destroys the poetry of this story, that feather and dirt-feeding and parasitic insects and spiders should be the first inhabitants of newly formed oceanic land."

That the bright red Discoloration of the Sea, at times, near Tierra del Fuego is due to Spawn

This is a popular notion with sailors, and Darwin ("Voyage of a Naturalist") mentions that he *once* found it to be a fact, but that the general cause is the number of crustacea (somewhat like prawns as regards form) present in the water at those times.

That an Insect or Animal will not Eat one of its own kind

The phrase "dog cannot eat dog" is fairly common and may be true, but in the case of wolves it is pretty certain that they do eat their freshly killed fellows. An amusing tale of one creature eating another of its own kind is related by Prof. James Sully, in his "Studies of Childhood," of a little boy in his fifth year playing with a tadpole till it died, whereupon the other tadpoles immediately ate it, and the child cried. His elder sister tried to comfort him by saying:—"Don't cry, William, he's gone to a better

place"; which provoked the sceptical question, "Are his brothers' and sisters' stomachs a better place?" Darwin relates ("Voyage of a Naturalist") that he found one scorpion eating another, and we have read elsewhere of young scorpions eating their mother! Sir J. Dalyell records having seen a horse-leech eat a medicinal leech—the process lasted three hours because the latter leech objected vigorously to the process.

That Sponges are Plants, and hence belong to the Vegetable Kingdom

They have a plant-like appearance, and, consequently, were considered such, even by naturalists, up to the beginning of the nineteenth century. They have been since then recognised as one of the lowest forms of animal life. The sponge as we know it in ordinary daily use is the framework by which the living organism used to be supported, the organism being merely a soft slime enveloping each fibre of the frame. The slime is closely allied to Amœbæ, another very low form of animal life.

There are two very interesting facts connected with living sponges. The first is that though the adult sponge never moves from the place where it once becomes a fixture, the baby sponges are able to swim. And the second is, that all flints were at one time sponges! It is hard to believe, no doubt, but truth, remember, is stranger than fiction.

That Coral is formed by Insects—Coral Insects—and that it is comparatively Valueless

An insect invariably has six legs, and three distinct parts, viz. the head, the thorax (to which the legs are attached), and the abdomen. Coral, however, is formed by polyps which are animals, but not nearly so highly differentiated as insects, having in fact soft gelatinous bodies. As to their shape, we may imagine a number of sea anemones joined together, and then greatly reduced in size.

For a full account of the work of these coral animals in forming lagoon-islands, atolls or barrier-reefs, see Darwin's "Voyage of a Naturalist."

The value of coral, by the economic law of supply and demand, has decreased somewhat in recent years, because it is no longer a fashionable ornament, but formerly some varieties (such as that having a delicate pink or flesh

colour) sold for five times their weight in gold; and even to-day, in one list we have consulted, we find the price of a coral necklace (the weight of which must be very small) is £3.

That Oysters deposit their Eggs on one another's Shells

In this belief, oysters have been taken from one place to another on the supposition that the white matter sometimes found on their shells is their spawn.

Instead of being so deposited, the eggs are retained within the shell until they are hatched, and then instead of being the little inert creatures which we might naturally suppose, they flit about the sea-water much as a butterfly does in air; and, having sown their wild oats (if they have escaped their enemies the while) they at length settle down to become steady, solid, domestic oysters ready for the enemies of their old age to swallow with vinegar and pepper. *See* "Shellfish, their Ways and Work," by Prof. E. Forbes.

That a Horse-leech can Penetrate the Human Skin

Leeches are far less frequently used in medical practice than they used to be in the days when blood-letting was so common; but the fallacy arose then and continues, the idea being that if a horse-leech be used instead of the medical one *(Hirudo medicinalis)* all sorts of terrible things will happen to the patient by the leech burrowing under his skin. Dr. E. Lankester, F.R.S., was probably one of the first to point out this fallacy, and it is curious to note, what we do not think is commonly known, that one meaning of "leech" is "a physician, a medical practitioner, a professor of the art of healing." Shakespeare, in "Timon of Athens," the second and third lines from the end, says:—

> "Make war breed peace, make peace stint war, make each
> Prescribe to other as each other's leach."

That the Crabs' Eyes mentioned in ancient Materia Medica meant the visual organs of Crabs

Dr. E. Lankester, F.R.S., states that the crabs' eyes of Materia Medica referred to little pellets found in the stomachs of crabs, and consisting chiefly of carbonate of

lime with some phosphate of lime. He thinks they may have had some medicinal value on account of the latter ingredient. The name crabs' eyes is also applied to the seeds of *Abrus pecatorius*, or Indian liquorice, and these also are used medicinally, namely, as a remedy in diseases of the conjunctiva. A more familiar use of these seeds is for rosaries and necklaces.

That the Common Land Tortoise eats Blackbeetles

They are sometimes sold for this, in which case it is not they only who are sold, for Prof. T. Rymer-Jones, F.R.S., states they feed "exclusively on vegetables." It is possible that blackbeetles do not like sharing their quarters with a tortoise, and that, consequently, they leave. If this should be so, then the end obtained is very like that sought.

That a Nautilus Sails

The tale is that the nautilus *(Argonauto Argo)* floats in its shell, holds some of its arms up as sails, and uses one or more for steering purposes. Referring to this myth (which was started by Aristotle) Prof. T. Rymer-Jones, F.R.S., says:—"It is almost a thankless office to dispel so pretty a fiction; modern researches, however, serve to show that its sailing capabilities have been greatly exaggerated." As a matter of fact, the nautilus has a greater knowledge of hydraulics than pneumatics or seamanship. Anyway, it swims by means of what an engineer calls jet propulsion, *i.e.* it takes sea-water into its body and then ejects it forcibly. The arms are trailed behind and used for steering. Its more usual mode of progression is to crawl along the sea-bottom with its shell the other way up, namely, the same way as a snail carries its shell.

That Snakes cannot be Killed by an injection of their own Venom, and that their Blood is not Poisonous

This subject was investigated some years ago by M. Calmette, and was briefly reported in the *University Correspondent*, of August 28, 1897. M. Calmette found that snakes *can* be killed by an injection of their own venom. He found also that the blood of a snake *is* poisonous, while the blood of a pig—an animal proof against snake bite—does not confer immunity by injection, and seems to have no effect on the poison whatever.

That Blind-worms, or Slow-worms, are Blind, Poisonous, and Worms or Snakes

This is indeed a case of *multum in parvo*, for they are *not* blind, they are *not* poisonous, they are *not* worms, and they are *not* snakes! The case is thus very similar to that of the crab, which on a celebrated occasion, was defined as "a little red fish that walks backwards," a description which Cuvier said was admirable, except that a crab was *not* red, *not* a fish, and did *not* walk backwards!

The blind-worm is perfectly harmless, on the authority of Gilbert White, the Rev. J. G. Wood, and the "Century Dictionary." They are not blind, on the authority of Prof. T. Rymer-Jones, F.R.S., the "Century Dictionary," and "Pannell's Ref. Book." They are not worms, on the authority of Prof. Rymer-Jones. They are not snakes, on the authority of the Rev. J. G. Wood, Prof. Rymer-Jones, the "Century Dictionary," and "Pannell's Ref. Book."

With so many negatives the reader will wonder what they are; well, they are lizards. The reason for classing them as lizards being because they have rudimentary pelvic and shoulder girdles, small eyes with *movable* lids (the eyelids of snakes are not movable), and some say rudimentary limbs under their skins.

"The slow-worm, or blind-worm (*Anguis fragilis*) is found over the greater part of Europe, and the adjacent parts of Asia; and it is common in many parts of England, frequenting copses, orchards, old mouldering walls, and banks where it delights to bask in the sun; it is a sluggish, timid creature, and when handled, even roughly, seldom attempts to bite. If it does, its jaws are too small and feeble, and its teeth too minute to inflict a wound; scarcely, indeed, does it make an impression, and the opinion that it is venomous is as absurd as it is erroneous. Let those who believe it put it thus to the test, examine the creature's teeth, try their effect on any small animal, and not give up their common-sense to the assertions of the ignorant.

"It is not blind, but has small, bright and quick eyes."—"The Royal Nat. Hist.," edited by James Wylde.

The Rev. J. G. Wood, F.L.S., the eminent naturalist, says in "Common Objects of the Country":—"The names that are given it are hardly in accordance with its formation, for it is not very sluggish in its movements,

although it can be easier taken than the lizard; while it is anything but blind, and its eyes, though small, are brilliant. Perhaps the epithets ought to have been applied to the givers and not to the receivers."

This little creature is also called a deaf-adder, though it is *not* deaf, nor is it an adder!

It is also known as a "slow-worm," "orvet," and Aberdeen snake.

It is said that Shakespeare rarely made technical mistakes—he seems to have been well informed in the subjects of all professions and callings—but he did so in the case of this so-called "blind-worm," for he referred to it as "the eyeless, venom'd worm," thus making three mistakes in four words!

That a Glass Snake is a True Snake

It is a large, limbless lizard *(Ophiosaurus ventralis)*, abundant in the southern United States, and so called from its general resemblance to a snake and the extreme fragility of its tail, which, fortunately, grows again, to some extent, after it has been broken off.

Other instances of legless lizards which are very naturally mistaken for snakes are the blind- or slow-worm, and the scheltopusik *(Pseudopus)*.

VEGETABLE KINGDOM

VEGETABLE KINGDOM

That "Mummy Wheat" will Grow

"MUMMY WHEAT" is the name given to the wheat found in the pyramids of Egypt, and which is, therefore, some thousands of years old.

"The vitality of seeds is very variable as to duration. Amongst instances of short-lived seeds are acorns, which germinate at once, and maple seeds. As a proved instance of long-lived ones, the sacred bean of India is the most authentic; one such taken from a herbarium upwards of 100 years old, having germinated.

"Wheat is said to keep for seven years at the longest. *The statements as to mummy wheat are wholly devoid of authenticity;* so are those as to the raspberry seeds taken from a Roman tomb. On the other hand, that seeds may remain buried alive in the soil for many years is rendered most probable, by the fact of charlock and broom appearing suddenly and in quantities in newly-turned up soil that had not been disturbed for long periods. It is, however, difficult to believe that such a moist complex substance as living protoplasm can resist chemical change sufficiently long to favour the idea that seeds have lain buried alive for many hundred years."—Sir John D. Hooker, P.R.S.

Mr. C. E. Clark, in his "Mistakes we Make," deals thus with this fallacy:—

MUMMY WHEAT.

"There is the belief that 2,000 years' old wheat will come to life. Mummy wheat will not grow except in the estimation of certain credulous folk, chiefly tourists. The stories of wheat found inside sarcophagi and mummy cases germinating after thousands of years have been proved unauthentic times out of number by Hooker, Carruthers, Flinders-Petrie, Newberry, and every other botanist and antiquary of any eminence, and likewise by committees of the British Association and the United States Department of

Agriculture. Wheat seldom preserves its vitality beyond the eighth or ninth year. In the *Standard* lately appeared a letter from Mr. Newberry, who therein says that out of the seeds of thirty species of plants found by him in similar situations, not one sprouted. His latest failure was three peach stones—probably of Roman date—disinterred from a tomb at Beni Hasan, in Upper Egypt. The fact is the seeds, like the mummies, have been oxidised to the very centre, and the chances of renewed growth are, therefore, about as problematical as the discovery of favourable conditions for revivifying defunct Egyptians. At the South Kensington Health Exhibition there was shown a model of the Roman baths uncovered at Bath, and in the centre the present writer remembers seeing a large seed pan filled with ferns, to which was attached a label stating that they were grown from seeds (spores) obtained from fern leaves during the excavations, and found so many feet under the Roman ruins, where they had lain so many hundreds of years—and the public believed it!"

That Orchids Live on Air

Air consists of about 79 per cent. by volume of nitrogen, and 21 per cent. of oxygen, besides traces of other elements and some compounds. An example of the former is Argon; of the latter, carbon dioxide (4 vols. in 10,000), ammonia, and aqueous vapour (1.4 per cent.), are the most important.

Now for a plant to grow, its roots *must* be supplied with the following elements, in some form or other, besides with water, viz.:—potassium, calcium, magnesium, iron (a trace), nitrogen, sulphur, and phosphorus. Carbon, which enters so largely into the composition of vegetable matter, is obtained by the plant from the carbon dioxide in the atmosphere, and this is the *only* substance which the vast majority of plants are capable of obtaining from the air. The only other substance which a few plants can obtain from the air is nitrogen, and the plants which have this power belong to the order *Leguminosæ* (peas, beans, lentils, etc.); though even in this case it is an indirect power, for it depends on certain bacteria being present on the roots of these plants. Hence, as the atmosphere does not contain all the elements which are *essential* for the growth of a plant, it is quite clear that orchids cannot "live on air," though, being

bulbous, they might live on their store of nourishment for a little while, just as a potato will sprout if kept in a moist atmosphere. A young couple might as well try to "live on love," as a plant on air! When impecunious Edwin was about to marry Angelina he was asked by a more prudent friend whether they intended to "live on love." "No," replied Edwin, "but on my love's father."

Some Fallacies connected with the Vegetable Kingdom

Why are Jerusalem artichokes called by that name? They are never seen in the Holy Land—will not even grow there—and the root-flavoured vegetable would hardly appeal to the taste of the people of Palestine. Neither are French beans French; they come from South America. And rose-wood is not the wood of any kind of rose-tree, does not smell like roses, nor is it red. Cedar pencils, again, are not made from cedar wood, but from pear or lime, and the business part is not lead, any more than the blacklead with which grates are cleaned is lead. It is carbon in one of its purest forms, as different from lead as milk is from chalk; though, in saying this, we know some facetious people will assert that there is not always the difference between these two articles that there should be!

"Jerusalem" (artichoke) is a corruption of the Italian word *Girosole* (sunflower), of which the Jerusalem artichoke is a species *(Helianthus tuberosus)*.

The Tuberose has nothing to do with "tubes" or "roses," but this common name is a corruption of its botanical name *(Polianthes tuberosa)*.

Gilliflower is probably July-flower.

That the Sunflower always faces, and turns with, the Sun

"In the modern vernacular this name is most commonly applied to the various species of *Helianthus*, especially to *Helianthus annuus;* but, as this is a tropical American herb, and the word 'sunflower,' or something corresponding to it, existed in English literature prior to its introduction, or, at any rate, prior to its general diffusion in gardens, it is obvious that some other flower than the *Helianthus* must have been intended. The marigold *(Calendula officinalis)* is considered by Dr. Prior to have been the plant intended by Ovid, Met., iv., 269-70).

" . . . . *Illa suum, quamvis radice tenetur, vertitur ad*

solem; mutaque servat amorem," and likewise the *solsæce* of the Anglo-Saxon, a word equivalent to *solsequium* (sun-following). But this movement with the sun is more imaginary than real, the better explanation being afforded by the resemblance to 'the radiant beams of the sun,' as Gérarde expresses it.

"The so-called 'Jerusalem artichoke' *(Helianthus tuberosus)* belongs to the same genus. It is believed to be a native of Canada, or perhaps a modified form of *Helianthus doronicoides*."—"Ency. Brit."

It is quite certain, as Gérarde also says, that four sunflowers may be seen on the same stalk and facing the four cardinal points. Of course, four flowers on separate stalks would be a more convincing argument.

That a Pumpkin is a Vegetable Marrow which has been picked and kept for a long time

It isn't! All that we can add to this convincing statement is that they both belong to the natural order *(Cucurbitaceæ)*, of which the gourd, cucumber, melon, and water-melon are also species. The pumpkin is greenish when cut from the stalk, and it is kept in a dry place till it gets yellow, when it is sweeter. It is boiled and eaten like vegetable marrow; but when so boiled it is firmer, yellower, and has a stronger taste than the latter. It is eaten a good deal in South Africa.

That Mistletoe grows only on Oak Trees

It grows on many different kinds of trees, but chiefly on apple trees, and somewhat rarely on oaks. Possibly, it is usually removed from apple trees, while it is left unmolested on oak trees, and hence the origin of the fallacy.

That an Aloe lives 100 years before it flowers

On referring to the "Century Dictionary," under "*Agave Americana*," we find:—"It lives many years, ten to fifty or more, before flowering, whence the name *century plant*." It seems to us rather a stretch to call fifty years a century; it is equivalent to making an error 100 per cent.! Furthermore it would appear as if Prof. Daniel Oliver, F.R.S., does not consider the American aloe *(Agave Americana)* to be a true aloe, for he refers to it as "the so-called American aloe." In South Africa, the African aloe

flowers once in about twenty years, and there are aloes in the Scilly Isles which do the same.

In September, 1906, there was a fairly long account of aloes in general, because one was then flowering in the Zoological Society's Gardens in London, and this one was said not to have flowered for 100 years. On looking the matter up, however, we find that the Zoological Society was not in existence 100 years ago, having been founded in 1826! Of course, it may be argued the aloe was on the site before the gardens, but this we think highly improbable.

That the Sap of Trees goes Down in Winter and Up in Summer

It is not that the sap goes *down* in winter, it merely does not go *up* then; while during the active spring vegetation, the sap goes up comparatively very rapidly to help form the new leaves and shoots, and to replace evaporated sap. It must not be thought, either, that there are continuous though small open tubes running right up the trunks of trees or plants. These trunks are made of innumerable cells and the sap is transferred from one cell to the next through the cell walls by osmosis.

That Beetroot Sugar is made from Red Beetroots

The red variety is the one commonly eaten as a vegetable, while the white one is practically unknown to the public. Hence the mistake, for it is the white variety which is called the sugar-beet, which is very sweet, and from which sugar is prepared on the Continent.

That Betel-nut is Chewed by Natives with the Leaves of the Betel Pepper only

The extent to which the betel, or areca, nut *(Areca Catechu)* is used by the natives of India may be gathered from the fact that over 4,000 tons of the nuts are exported annually from Ceylon into India.

Sir Edwin Arnold's account of an Indian peasant and this practice is as follows, and as he was such an authority on Oriental customs, we conclude his is the correct report:—"At the hour of repose his custom is to disengage from his turban and loin cloth a small bag with partitions, tied with a string. This he unrolls deliberately, and there is seen a layer of green leaves from the pepper vine, a lump

of lime, two or three nuts of the areca palm, a few cloves, and an iron implement something like a nut-cracker. With this he breaks off some fragments of the aromatic nut, mingles them with a little of the lime, lays both in the hollow of a pepper-leaf, which he folds over and pins with two cloves, putting the whole medley into his mouth, and joyously chewing it."

Thus we see it is quite an elaborate process, appearing as strange to us, perhaps, as the preparation of a salad and salad-dressing appears to a native Indian.

That the Rose of Jericho really Revives when put into Water

The rose of Jericho, also called the resurrection plant, the rose of the Virgin *(Anastatica Hierochuntina)*, is remarkable for the power the dried and shrivelled-up plant has of absorbing water and *appearing* to revive when placed in it. This action is due to the dry protoplasm in the cells becoming expanded, and thus causing the branches to straighten out in a similar manner to that in which a flaccid hose-pipe straightens out when water is forced through it.

The name *(Anastatica)* has reference also to the popular belief that the plant blooms at Christmas and remains expanded till Easter.

MINERAL KINGDOM

That German Silver contains Silver

IT is the "white copper" of China, introduced into Europe by the nation noted for its bands, and does not contain any silver, the following being its usual composition :—

Copper	4	parts by weight.
Nickel	2	
Zinc	1	

These proportions are varied by different makers, and sometimes a small quantity of lead, and even iron, is added.

It has been suggested that the word is *german = akin to*, as in "cousin-german," but this is wrong, for in that case German silver would be written with a small g, which it is not. It is called German silver because first made in Europe at Hildberghausen in Germany.

That Mosaic Gold contains Gold

Mosaic gold is merely a compound of tin and sulphur, known to chemists as Stannic Sulphide ($Sn S_2$), and may be made by heating a mixture of finely divided tin, sulphur, and sal-ammoniac *(ammonium chloride)*.

That Chloroform is Inflammable like Ether, Benzine, and Spirits of Turpentine

The above four fluids are very similar in appearance, all being colourless (like water), and very mobile; and besides being volatile, each has a strong characteristic odour. Lastly, the latter three *are* highly inflammable, and hence, no doubt, the idea that chloroform is also. If a piece of paper be saturated with chloroform, it can be made to burn, but it burns better without it; and where there is a little pool of the liquid, this *evaporates* before the paper burns from under it.

That when you cool a Red-hot Iron (or other metal) Rod in Water, the heat rushes up towards your hand

If you take a poker that has been made red-hot at one end, and plunge this into a bucketful of water, the water in the immediate neighbourhood of the poker is converted into vapour. This warm vapour rises, impinges on the hand holding the poker, and creates the impression that the heat of the red-hot end has rushed up the poker to the hand.

That Aluminium is Yellow

This fallacy is rapidly becoming evanescent now that the metal is displayed in so many shop windows, and is used for so many purposes. No doubt it arose from the fact that, long before the metal in its unalloyed state was sufficiently cheap to be commonly used, it was used in small quantities alloyed chiefly with copper, to form aluminium bronze, or gold (which contains 10 per cent. of aluminium and 90 per cent. of copper by weight), and this alloy, as its latter name implies, has a golden yellow colour.

Aluminium—of which the strength is usually greatly overstated—is a silver-white metal, having a specific gravity of 2.7; a tenacity of about 6.0 tons per square inch; and a pressure of fluidity of about 11.0 tons per square inch. It takes a high polish as can be seen by examining a piece of the reflector of "Linolite," the tubular incandescent electric light fitting.

That Carbonic Acid Gas (carbon dioxide CO_2) is not Poisonous, but merely does not support Life

If we take a deep inhalation, it is easy to hold our breath for over a minute (an expert swimmer has remained under water for over three minutes!), and if we first exhale as much air as we can, and then stop breathing, we can do so for half a minute or more. Hence, if carbon dioxide merely did not support life (like nitrogen) we should be able to breathe it for half a minute, that is the time for which we can do without air. This, we believe, is impossible; for if we put our nose within an inch of the surface of the yeast in a fermenting vat in full action, and then take a sniff, we think half a *second* will satisfy the

curiosity—albeit scientific!—of most people. It did ours, and our curiosity is as that of a woman!

Prof. Huxley, F.R.S., says:—"But in this asphyxiating process, two deadly influences of a distinct nature are co-operating; one is the *deprivation of oxygen*, the other is the *excessive accumulation of carbonic acid* in the blood. Oxygen starvation and carbonic acid *poisoning*, each of which may be fatal in itself, are at work together."

Prof. Thorpe, F.R.S., says:—"Carbon dioxide is irrespirable; animals soon die when immersed in it, not only from the want of oxygen, but also from the direct *poisonous action* of the gas. Even in small quantity, it produces great languor and depression; and in larger quantities, it occasions complete atomy of the brain functions."

G. S. Newth, F.I.C., F.C.S., says:—"Although carbon dioxide is not such a poisonous compound as the monoxide, it nevertheless does exert a direct poisonous effect upon the system, and death caused by this gas is not merely due to the absence of oxygen."

The foregoing are in respect to its action on the lungs. It does not appear to act as a very active poison in the alimentary canal, for aërated waters and fermented liquors contain considerable quantities of it.

Many headaches and much drowsiness are produced by the high percentage of carbon dioxide in a room, which, being full of people and lights, has every door and window carefully closed—to make it "cosy"(!)—so as to prevent the possibility of any fresh air so far forgetting itself as to enter the room. Oh, yes, medical men must live.

That a Diamond never wears out

"It is altogether an error to suppose that diamonds will not wear out. In the shops of wholesale glaziers, where the diamond is in constant use, one is worn down in a month or six weeks, so as to require resetting; after which, with the same wear, it usually lasts another month, and then becomes useless. It may, however, be presumed that such diamonds travel over some miles of glass before they are worn out. It is likewise a singular and interesting fact, that only the natural point of the diamond will cut, whilst that obtained by polishing will not cut glass."—John Timbs, F.S.A.

It is not generally known that a diamond is composed of the element carbon in its purest form, and that *real* diamonds were made some ten years ago by the French chemist, Moissan, and others who have copied him.

That Sapphires are always Blue

It is true that the name sapphire is usually restricted to the blue variety, but red, green, white, violet, and yellow sapphires also are found. They are all slight variations of the mineral corundum which is next to the diamond in the scale of hardness.

MUSICAL INSTRUMENTS

acoustical defects are usually set aside for this showy purpose. There are two reasons why these pipes are not actively employed; (1) They are usually set up in a light framework, which stands some little distance in front of the working pipes, and (2) they are arranged symmetrically for appearance sake, and this is not convenient for their connection with the rest of the organ.

That a Cracked and Patched Violin is better than one of the same age without Cracks and Patches

There are probably more fallacies connected with the violin than any other musical instrument. This may be partly due to its early origin, and partly to its importance, having caused it to be widely—though not wisely—discussed.

To read some of the books on the construction of the instrument gives one the idea that if their particular rules, dimensions, and materials were departed from in the slightest degree, the resulting instrument would have about as much sound in it as a "London Stock" brick, and that the quality of the tone would be even worse!

Some twenty years ago the author made five violins—no doubt the writers of the above books would call them *fiddles*, if nothing worse! The first three made no attempt at being of the orthodox shape, but the last two did, though they were all made before any instructions on the art of violin making had been read; consequently, even those which were intended to be orthodox, departed somewhat widely from the instructions. One of the montrosities was said to have a fair tone; another certainly had no tone at all, but this we believe to have been caused chiefly by the inelastic nature of the wood (a very soft, grainless, Cape cedar); and the third was made of wood, the greenness of which was only equalled by that of the individual who was foolish enough to spend any time on it. Of course, this one also had no tone, though it now has a crack in the belly a quarter of an inch wide. So much for cracks!

While two of these experiments were thus such failures, the one that gave the good results (considering the crudeness of the workmanship), was the one that departed most from the orthodox form. [An ordinary violin-case, *i.e.* a wedge-shaped box with curved top, will give a fair idea of

its shape.] The first orthodox one was made much more carefully than the last one mentioned, and had good wood in its favour, in fact it had *too much* good wood, for when completed, it was half a pound heavier than the model from which it was copied! The tone of this was not so good as that of the first montrosity.

Lastly, the second orthodox one also had good wood and workmanship in its favour, and was only slightly too heavy when finished. This is said to have an excellent tone [it gained a bronze medal at the Colonial and Indian Exhibition, London, 1886], though judging from the books we afterwards read, it should not sound at all, for, of course, there was the terrible "lost secret of the old varnish" to contend with also!

The best violins that are made now will probably be every bit as good as the old violins are now, when they (the new ones) have been played on and seasoned for the same time, *i.e.* for some 200 years.

A good violin should be taken great care of, and the fewer cracks and patches the better; for were the popular idea correct, we should make violins of patchwork and the necessary glue and resin in the first instance.

That playing Discords on a Piano puts it out of Tune

Playing a piano consists in causing certain of the wires to vibrate, and the combination or sequence of notes struck is chosen so as to give a pleasant auditory effect. This is playing concords. In playing discords, the only difference is—although it may sound much more!—that the combination, or sequence, of notes struck does *not* produce a pleasing auditory effect, though each individual wire, whether struck in a concord or discord, always gives the same number of vibrations per second. Hence, the mere fact of playing a discord does not tend to put a piano more out of tune than playing a concord, but in the ordinary course of events discords are played by persons who are not skilled pianists or musicians at all; and hence, they are liable to ill-treat the instrument by thumping, etc., and this would tend to put it out of tune. But while a discord *per se* has no deleterious effect, it does not actually tend to improve a piano as the playing of concords does, for a concord causes the sound-board to vibrate in

a manner that it will be called upon to do in the actual performance of some composition, whereas the discord will exercise the sound-board in some other manner, such as it will not be required to do in actual practice. As an illustration, suppose two exactly similar and new pianos, and two equally skilful pianists. Let these two performers make use of their respective instruments for the same number of hours per day, and the same number of days per year for, say, two years, one performer playing only concords, the other equally carefully only playing discords; then at the end of the period the piano that has had discords played on it will not be so mellowed and improved in tone as the one that had concords executed on it.

We believe the experiment has been tried of mellowing violins by a mechanical arrangement which drew a bow over the strings; but this "harping on the same old tune" (?) was not found to do the good that a skilful performer could in the same time, and this for similar reasons to those stated above.

What occurs when a note of a piano goes out of tune is, the pins to which the ends of the wires are attached "give" slightly, the tension of the wire is thereby lessened, and the pitch of the note is consequently lowered. Or the frame in which the pins are inserted may alter its shape slightly, and this will have a similar effect; hence, one of the advantages of an iron frame, which is not so much affected by the condition of the atmosphere. Lastly, the temperature of the wires will affect the notes they emit in the following manner:—The wires are not all the same length, but are shorter and shorter as we pass from the lower notes to the higher ones. Now, when steel, of which most of the wires are made, is raised in temperature it expands; therefore, when the temperature rises *each inch* of the wires becomes longer by the *same* amount, hence, the total elongation of a wire twenty inches long will be four times the total elongation of a wire only five inches long; consequently, the lower notes are lowered more than the higher ones, and then the piano is out of tune. The actual length of the vibrating portion of the wires is also slightly increased, owing to the expansion of the frame; this effect itself would still further flatten the notes, but it also prevents the tension in the wires becoming so low

as it otherwise would do on account of the expansion of the wires, hence the expansion of the frame has a differential action; and when the distance between the points of support of a wire is constant, while the wire itself elongates, the *tension* is decreased, and it is this which flattens the note. On the other hand, if the temperature fall very much below the temperature at which the piano was when it was tuned, then the total *contraction* of the longer wires will be greater than that of the shorter ones; hence, for similar reasons, the lower notes will be more sharpened than the higher ones, and the differential action of the contraction of the frame would be similar to what it was before.

That the Art of Making Varnish for Violins is Lost

We admit we have no direct evidence (not having tried to get any) to bring forward in support of the above statement being a fallacy, but it is our opinion—take it for what it is worth! and see the fallacy on cracked and patched violins, page 138—that it *is* a fallacy.

The world is advancing in knowledge by leaps and bounds, though there is an *infinite* unknown field, and our skill in manufacture is vastly superior to what it was only fifty years ago. Why it is not so very long ago when it was considered a grand success to be able to turn an engine cylinder that was true to within *a quarter of an inch!* now one-thousandth of an inch is a common limit of inaccuracy for machine parts, and Prof. C. V. Boys, F.R.S., measures time in *millionths of seconds*, and the heat of moonshine in units which he compares to the heat of a single candle at a distance of so many *miles!*

In other branches of industry similar examples could easily be given; therefore, it seems unreasonable to think that we should have retrograded in the manufacture of varnish or polish. We do not believe that the varnish is the all-important substance that some writers on the violin would have us believe, but that the new varnish almost necessarily going on to new violins is given the discredit of the inferior tones, which are truly due to the newness of the violin. We have heard it stated, and believe that there are violins being made now which, as regards workmanship and materials, are as good, or even better, than those of

the old masters; and that when these modern violins are as old as the old ones are at present, and have been played on as much, they will have tones quite as good.

That American Organs have Pipes in them [similar to those in Church Organs

"The American organ (a kind of harmonium of late years much in vogue) owes its popularity to its being less pronounced and reedy in timbre (its softer tone being nearer to that we are familiar with in the church organ), and to its being easier to play for simple domestic use.

"The harmonium and American organ are both known as 'free-reed' instruments, the musical tones being produced by tongues of brass, technically 'vibrators,' set in oblong frames [similar to those in a mouth-organ.—ED.]; the sides of these they do not quite touch, but pass, when in movement, freely downwards—the 'beating reeds' used in church organs covering the entire orifice. A reed or vibrator, set in periodic motion by impact of a current of air, produces a corresponding succession of air puffs, the rapidity of which determines the pitch of the musical note. There is an essential difference between the harmonium and the American organ in the direction of this current; in the former the wind apparatus forces the current upwards, and in the latter sucks it downwards."—A. J. Hipkins, F.S.A., in "Ency. Brit."

A friend of ours, who possesses an American organ, and believes that it contains organ pipes, will not allow us to pull the said organ to pieces in the search after knowledge and truth; partly, no doubt, because he values his instrument—pipes or no pipes—and partly because he does not wish to feel "done," for, of course, when buying it he was told it contained pipes!

LEGAL

LEGAL

That a Woman may Marry her Deceased Husband's Brother

No. 117 of "One Thousand Legal Facts" states:—"You cannot marry your deceased husband's brother."

That if a Woman's Husband leave her, and she neither Sees him nor Hears of him for Seven Years, she is at Liberty to Contract a Legal Marriage again

No. 279 of "One Thousand Legal Facts" states:—"Where a husband or wife has been absent for seven years and not been heard of, and is still living, though *the second marriage of the other party is void*, yet there can be no prosecution for bigamy in such a case."

Mr. John Timbs, F.S.A., gives the following:—"It might be expected that the "uncertainty" of the Law would lead to many errors and absurdities as to its provisions; and from a host of such baits for credulity we select these:—

1. That if a criminal has hung an hour and revives, he cannot afterwards be executed.
2. That it is necessary in some legal process against the sovereign to go through the fiction of arrest; which is done by placing a ribbon across the road, as if to impede the royal carriage.
3. That Deeds executed on a Sunday are void.
4. That Leases are made for the term of 999 years, because a lease of 1,000 years would create a freehold.
5. That in order to disinherit an heir-at-law, it is necessary to give him a shilling by the will; for that otherwise he would be entitled to the whole property.
6. That a surgeon or butcher* (from the barbarity of their business) are ineligible as jurors.

* See "Butchers not Jurymen," in "Things not generally Known," page 175.

7. That pounds of butter may be any number of ounces.
8. That bull-beef should not be sold unless the bull has been baited previously to being killed.
9. That first cousins may marry, but second cousins cannot.

"If there is any foundation for this statement, it consists rather in the marriage of first cousins once removed than of second cousins. It will be seen that the latter relationship belongs to the same generation; but it is not so with the former, which partakes more of the nature of uncle and aunt with nephew and niece."—"Notes and Queries," No. 213.

The following quotation from Burn's "Ecclesiastical Law," by Phillimore, vol. ii. page 449, explains the matter:

"By the civil law first cousins are allowed to marry, but by the canon law both first and second cousins (in order to make dispensations more frequent and necessary) are prohibited; therefore, when it is vulgarly said that first cousins may marry, but second cousins cannot, probably this arose by confounding these two laws; for first cousins may marry by the civil law, and second cousins cannot by the canon law.

"The difference of the computation (of consanguinity) by the civil and canon laws may be expressed shortly thus: the civilians take the degrees in both lines to the common ancestor; the canonists take only the number of degrees in the longest line. Hence, when the canon law prohibits all marriages between persons related to each other within the seventh degree, this would restrain all marriages within the fourteenth degree of the civil law. All marriages are prohibited between persons who are related to each other within the third degree, according to the computation of the civil law. This affords a solution to the vulgar paradox, that first cousins may marry and second cousins cannot. For first cousins and all cousins may marry by the civil law, and neither first nor second cousins can marry by the canon law. But all the prohibitions of the canon law might have been dispensed with. It is said that the canon-law computation has been adopted by the law of England; yet I do not know a single instance in which we have occasion to refer to it."—"Christian's Notes to Blackstone's Commentaries," b. ii. c. 14.

Legal Fallacies

The following article from *Pearson's Weekly*, of August 8, 1896, deals with a number of legal fallacies; we, therefore, re-print it in full, and add sub-headings in the margin for convenience of reference:—

"The misconceptions of the public upon everyday questions of law are widespread and serious, leading as they frequently do to unfortunate consequences.

Two Accounts: If the Latter One be Paid, the Earlier One can still be Recovered.

"One of the commonest of these fallacies—indeed, it is remarkable how many intelligent persons, especially tradesmen, share it—is that if there be two accounts, say, owing from one person to another who accepts and gives a receipt for the later one, that such receipt virtually operates as a discharge of the earlier item, which cannot afterwards be recovered. It scarcely seems necessary to tell intelligent people that there is not one grain of truth in this belief, the only question being whether the item itself has been paid or not. Indeed, a receipt for the item itself would not be conclusive, a receipt not being, as is often imagined, final, but only evidence of payment, which could be contradicted by any other evidence showing that in reality the money had not been paid.

"One Dog-bite Free."

"Possibly a still more prevalent error is that relating to damage done by dogs. 'One bite free' is a very common saying which is generally believed to express the law upon this subject. There is some slight ground for this belief, which has, indeed, arisen from a confusion of the evidence which has been given on particular occasions with the principle which governs the question. When an action is brought against the owner of a dog for injury which it has done to another person, the whole gist of such action, like that of almost every other action for damage done, is negligence upon the part of the defendant.

"If the evidence shows that he has been negligent, then he is liable for damages, otherwise he is not.

"As it is a common and universal practice for men to keep dogs, and to allow them to wander at large, it could not reasonably be said that a man was negligent simply because he allowed his dog to be in a position to bite anyone. But all would agree that if a dog were known by its master to be ferocious or likely to bite human beings, then he would be negligent in allowing it unre-

strained liberty. In such an action, therefore, it is merely necessary to prove that the master himself was negligent, and the most natural way of proving this is by showing that the dog had bitten or attempted to bite someone before.

"But the negligence might just as well be proved, and often is proved, in another way, by showing, for instance, from other facts that the master had good reason for knowing that his dog was fierce, although it had never previously attempted to bite anyone, in which case, of course, there would be liability for the first bite, and it would be incorrect to say 'One bite free.'

"Trespassers will be Prosecuted."

"'Trespassers will be prosecuted' is a well-known terror-striking phrase to the community; but there is nothing in it, according to the strict sense of the words as they are generally understood, conveying as they do the idea of durance vile and fines. No man can be 'prosecuted' for simply trespassing upon the land of another, if we take the word 'prosecuted' in its ordinary and proper acceptation, as implying criminal prosecution. All that the owner can do is to sue the trespasser in a civil court for the damage he has done to the land, and, as this would be trifling, the damages awarded would be merely nominal, unless there were aggravating circumstances.

"If the court thought that the action was oppressively brought against an unintentional trespasser, it might well order the owner himself to pay the costs, which are always in its discretion. Of course, the trespass might be accompanied by wilful damage, or other criminal action, for which the trespasser might strictly be 'prosecuted,' although, of course, in such case he would not be prosecuted as a mere trespasser. There is, then, not much terror in such notice.

Libel.

"How often do we hear the expression, 'The greater the truth, the greater the libel.' As generally understood, this is directly opposed to the truth. The fact is that in a *civil* action for damages for libel, the truth of the assertion is an absolute defence, and it should be 'where there is truth there is no libel.' Indeed, truth and libel cannot, in such case, go together. It is somewhat different, however, in the case of a *criminal* prosecution for a libel, one of those survivals of the dark ages, which is still allowed to exist.

"The publication of damaging statements, whether true or false, has been considered by our legal sages as likely to lead to breaches of the peace, and, therefore, to be a fit subject for punishment; and that the more truth there is in such statements, the more likelihood is there of mischief resulting. But even in a criminal proceeding the truth of the statement may be inquired into, and the court in pronouncing sentence may consider whether the guilt is mitigated by the evidence of its truth. The current maxim, therefore, has not much reason to support it.

Notice to Quit a House.

"It seems to be a common impression among householders and other tenants that a notice to quit, in order to be valid, must be given before twelve o'clock at noon, and the insufficiency of a notice given later has often been set up in the courts. But the law knows nothing of such limit, and an act done, or an event happening at any time of the day is, as a rule, as valid as it would have been at any other time of the day.

Coming of Age.

"Thus, also, it is a common impression that a man comes of age on his twenty-first birthday. The fact is that he comes of age at the very first moment of the previous day. As the law does not concern itself about trifles it does not consider portions of days, and having thus entered upon the last day which is required to complete twenty-one years of life, he is considered to have lived those twenty-one years.

Tenants.

"Another misconception very common amongst tenants is that a tenancy agreement can be properly stamped with a sixpenny stamp, in the same way as any other agreement, and many persons take agreements for tenancy instead of leases, under the impression that they can thereby save stamp duty.

"There is, however, a special provision to the effect that a tenancy agreement shall bear the same stamp duty as a lease, so that, if stamped with an ordinary sixpenny stamp, it cannot be put in evidence. The legislature had foreseen that, as a tenancy agreement was virtually as good as a lease, tenants would be tempted to take the former in order to avoid payment of duty. They, therefore, made this provision, which should be better known among the non-professional classes.

Wills.

"Another misconception with regard to stamping docu-

ments is that a will requires stamping in the same way as a deed. This idea, though common, is as erroneous as another which sometimes finds expression, even in well-known books, that a will requires 'sealing and delivering.' Of course, as most people know, it only requires signing in the presence of two witnesses.

Right of Way.

"But one of the most widely-spread errors upon legal subjects relates to the question of 'rights of way.' It is very frequently stated that the public must, in order to obtain a right of way over any private lands, use it continuously for a period of twenty years. This is entirely a mistake, which has evidently arisen from the confusion of the subject with that of 'prescription.' The latter is the means by which a right of way or other 'easement,' as it is called, arises between private persons, and it is necessary in this case by the terms of the Prescription Act, that it should be used for twenty years previously.

"The means, however, by which the public acquire a right of way is by what is termed 'dedication,' that is by evidence of the owner's intention to dedicate the way to the public. For this no particular time is necessary; indeed, there may be such an avowed act of dedication that it will take place immediately. The whole question is one of intention, and the length of time during which the public have used the way is only one element to be considered. It has been thought by some that the period of twelve months is the necessary time to prove dedication, and this idea seems to have arisen in the following way:

"When the owner of land wishes to allow the public the use of a path across it, but does not wish to dedicate it absolutely, and thus lose his control over it, he shows his intention by occasionally closing it, as, of course, he is entitled to do. In many cases the owner thus closes the way once every year, although there is no more reason for such period than for any other period, and thus the impression has arisen to which we have referred. It is like the 'one bite free' case—merely an illustration of the frequent practice of mistaking the particular application for the general rule.

Disinheriting an Heir.

"It is, again, said to be a somewhat common belief that it is necessary, if a man wishes to 'disinherit his heir,' to leave him at least one shilling by his will, which is

popularly known as 'cutting the heir off with a shilling.' This entirely erroneous idea seems to have been derived from the Roman law doctrine of 'inofficious testaments,' whereby, in certain cases, wills which purported to disinherit children and others were void.

Definition of "Heir."

"The word 'heir' leads to another popular misconception. Often one person is spoken of as being another's heir during the lifetime of the latter, and men frequently say they will make a certain person their heir. This, according to the legal view, is entirely wrong. The heir is the person who succeeds to his ancestor's land on an intestacy, and any other to whom he may leave it by will is not his heir, but his devisee; indeed, no one can make any person his heir.

"Again, the person who, if he survive the owner, will succeed as heir to his property is commonly, during the owner's lifetime, called his heir. This again is legally wrong, for any presumptive heir may die before his ancestor, and, according to the law, the heir is not ascertained until the ancestor's death, the maxim being 'No one is the heir of a living man.'"

Palmistry and Spiritualism

Those who are unfortunate enough to believe in Palmistry or Spiritualism will be interested to know how the following Act deals with the subject:—

"By the Vagrant Act of 1824, 5 Geo. IV., c. 83, s. 4, any person pretending or professing to tell fortunes, or using any subtle-craft, means, or devices, by palmistry, or otherwise, to deceive and impose on any of His Majesty's subjects, is to be deemed a rogue and vagabond. Under this Act a person may be convicted for attempting to deceive by pretending to have a supernatural faculty of obtaining from invisible agents and spirits of the dead answers, messages, and manifestations of power, viz. noises, raps, and the winding of a musical-box."—James Williams, B.C.L., "Ency. Brit."

That London Cab Fares are Doubled after Midnight

We have been unable to discover how this mistake has arisen, and the only reason that we can suggest—in spite of our total abstinence principles!—is that as certain objects, especially lamp-posts and the moon, have a peculiar way

of appearing double late at night after a good (?) dinner, some wily cabbies have seized the opportunity of impressing upon their clients the desirability of doubling the fares also, just for uniformity.

However, be this as it may, on inquiring about the matter we received the following reply, in September, 1896:—"I am directed by the Commissioner of the Police of the Metropolis to acquaint you that a cabman has no right to make a demand for double fare after midnight. —Yours, etc."

Once, when the author was travelling up from the North by a night train, there was a canny Scot in the same compartment. Our train was due at Euston at about 11.40 p.m., but we had been losing time, and there seemed to be a probability of our not reaching Euston till after midnight. This greatly troubled the Scot, for he believed that the cab fares were doubled after that time! We tried to comfort him by saying: "Well, we are going at a good pace *now*, and may just get in before twelve," and that we thought there was no regulation to the effect that the fares could be doubled. Lastly, we suggested that if the train reached Willesden at 11.50 p.m., the safest way would be to get out *there*, for although the distance would be greater than from Euston, it would not cost so much as the latter, because of being at the single rate. This advice was not taken, and when we last saw our companion he was rushing down the platform with a bag in one hand and a bundle of rugs in the other, in the hope of engaging a cab before the last stroke of midnight.

That the Police Regulations compel a Cyclist to carry a Horn, Bell, or Whistle on his Cycle

Our authority on this matter is our friend and former colleague, Mr. Arch. Sharp, B.Sc., A.M.I.C.E., of "Bicycle and Tricycle" (Longmans) fame, who tells us that so long as the cyclist makes a noise, or otherwise warns in time those who are in danger of being run over by him, he has done his duty from that point of view, and that if noise be his choice, this may be produced by his voice—begging his pardon!—or a tin pot, or trombone, or any other bone. The bell is, perhaps, the most satisfactory, for it is convenient, pleasant, and the best understood when

heard by the British Public. [Capitals because we belong to it!]

That a Shopkeeper may not refuse to supply an Article which he exposes for Sale in his Windows

The shopkeeper is not bound to sell any article to anyone who may demand to buy it.

That in the Poorer Districts and Parts of Towns in England a Man may Sell his Wife, and, having sold her, is Free to Marry again

In March, 1796, the *Times* announced the sale of a wife at Sheffield for sixpence, and about the same time stated that the price of wives had risen in Smithfield Market from 10s. 6d. to 3½ guineas!!

In 1887, also at Sheffield, a man acknowledged in the County Court that he paid 5s. for another man's wife, and, what is more, there was a written agreement to sell, worded thus:—"At the Royal Oak, Sheffield, I, Abraham Boothroyd, agree to sell my wife, Clara, to William Hall, both of Sheffield, for the sum of 5s."

Several other cases were given in an article, "The Trade in Wives," in the *Daily Mail* of March 1, 1899.

That a Dead Body must not be touched until the Police arrive

In murder cases this fallacy no doubt acts beneficially, as useful clues might be spoiled or lost if the least detail of the "setting" of the crime were lost to the police. But, unfortunately, it may also act dangerously, as in the case of persons apparently dead, who, if they received suitable and immediate attention, might be saved. An instance of this nature occurred in 1903 (and no doubt there have been many others), and was reported in the *Daily Mail* of Nov. 6 of that year. A lighterman was drowned in St. Katharine's Dock, and on one of the witnesses saying he believed the body was not to be touched until the police arrived, the coroner said that but for this the man's life might have been saved by the prompt use of artificial respiration.

That a Girl "Comes of Age" at 18, while a Man does not do so till he is 21

We are at a loss to know how this mistake has arisen, for on reference to any legal handbook it will be found that,

according to English law, *any* person under 21 years of age is an infant in the legal sense.

Apparently this is not so in Holland, for it was announced in the morning papers of September 1, 1899, that Queen Wilhelmina having become 18 years old the previous day, she was of age to reign alone.

That if Fowls wander into a Garden or Field they may be killed by the Owner of the Property

This is not so, as you may discover by referring to a legal handbook or your solicitor. It, of course, does not mean that the owner of the property on to which the fowls stray has no remedy. He may bring an action for damages against the owner of the fowls.

That if a Fruit Tree growing on one Person's Property overhang that of another, the latter has a Legal Right to the Fruit which falls on, or overhangs, his Property

If we may be allowed to say so, this is a very *fruitful* source of error! Again, we must refer our readers (who will not take our word for it) to legal reference books. The fruit, whether it has fallen or not, belongs to the owner of the tree, though it is true that, as a matter of practice, the owner of the tree usually foregoes claiming his strictly legal rights. Sometimes, however, he picks the fruit before it has time to fall, or before it is taken by his neighbour! The customary practice has arisen, we think, in this manner. The person whose property the tree overhangs can compel the owner of the tree to remove the overhanging branches. To do so means trouble, and possibly expense; but so long as the owner of the tree allows the other man to have the fruit on his side, the latter is not likely to make a complaint, and thus both are satisfied. Besides, in the case of several adjoining orchards, each owner would have similar privileges, which would average out to the same thing as if each stuck out for his pound of—*fruit*.

To remove the last vestige of the fallacious idea from your mind, we may mention the following further facts in connection with this question of ownership. The owner of the tree may apply to his neighbour for the fruit, or ask permission to enter and take it, and if the neighbour refuse both requests, then the owner of the tree will be justified in entering upon his neighbour's property without permission.

But he must not use force, nor may he commit any damage in so doing.

That if a Person A gives a Receipt to B "in Full Settlement," or "in Settlement of all Claims," and afterwards finds that he made a Mistake, he (A) cannot recover the Remainder of the Debt from B

A case which was heard by His Honour Judge Edge at Wood Green County Court on July 24th, 1906, was reported in the daily papers on July 25, 1906, and in giving judgment for the plaintiff (who sued for the balance of an account after he had signed a receipt "in settlement of all claims"), Judge Edge said:—"A man who has a debt owing to him, and agrees to take one-half, is not bound by the agreement unless there is some consideration for it." It turns out that the "consideration" is a mere nominal thing, so that if a man accept £30 and an old top hat in settlement of an account for £50, then he cannot sue for any more on that account. In fact, one authority goes so far as to say that if the creditor accept in full settlement a cheque or bill or anything *except English coin or Bank of England notes* for a lesser amount than the debt, he will be unable to recover the balance.

That if a Railway Passenger fail to produce his Ticket when alighting he can be compelled to pay the Fare from the Station from which the Train originally started

This fallacy and a number of other matters of interest to railway travellers are dealt with in "The Railway Passengers' Handbook," published by Geo. Routledge and Sons, Ltd.

That if a Return Railway Ticket be bought, the Return Half is Valueless unless it be used within the time stated on it

The above is true only in one particluar case, that is the case of day or half-day excursion tickets, which, if not used for return on the day specified, are valueless if the return fare charged is less than the ordinary single fare.

If the return fare paid be double the ordinary fare (as is frequently the case with third-class return fares), then the passenger is entitled to return when he wishes, *e.g.* in a week, month, year, or several years.

Again, even when the return fare is less than twice the single fare (but not less than once the single fare), and

the return half has "expired," it is *not* valueless, for the passenger may travel with it by paying the difference between its cost (*i.e.* half the cost of the "return") and the ordinary single fare. *Vide* "The Railway Passengers' Handbook," 1s.

That a Cheque drawn in favour of "Tom Jones," and crossed "Not Negotiable" or "Account Payee," cannot be legally paid into the Account of "John Smith"

This case has been quite definitely settled by the Courts, in the case of the National Bank *versus* Silk.

If "Tom Jones" endorse the cheque, *i.e.* sign his name on the back of it, then "John Smith" can legally pay it into his (J. Smith's) banking account, provided "Tom Jones" gave him the cheque. If after "Tom Jones" endorses the cheque he put it in his desk, and "John Smith" steals it from there and pays it into his (J. Smith's) account, then this is *not* a legal transaction, and the bank would lose the money, though they could proceed against "John Smith" for it.

In other words, the crossing of a cheque with "Not negotiable" or "Account payee" does *not* render it non-transferable, as is generally thought. The only crossing that does that is to make it payable to "Tom Jones" and cross it "Account payee *only*." Then, even if "John Smith" steal it after "Tom Jones" has endorsed it, he (J.S.) can only pay it into "Tom Jones's" banking account, and nobody who knows anything of such matters would cash it for "John Smith."

HISTORICAL

HISTORICAL

That the Diving Bell was invented by Sir William Phipps

"SIR WILLIAM was one of the first persons who used the bell advantageously, in recovering nearly £300,000 treasure from a Spanish wreck, near the Bahamas. The *invention*, or the earliest use, of the diving-bell was upwards of a century before the birth of Phipps; the first instance of its use being at Cadiz, in the presence of Charles V., in 1538, whereas Phipps was born at Pemaguid, in America, in 1650. There is likewise a popular American opinion that the Mulgrave family is descended from Sir William Phipps, which is a mistake; the founder of the Mulgrave family being C. John Phipps, one of the earliest explorers of the Arctic regions."—J. Timbs, "Popular Errors."

That, according to Scripture, the Fruit that Eve ate was an Apple

There is no justification for saying the *fruit* mentioned in Genesis ii. 17 and iii. 6 was an apple, though the idea is very old, as we may see by ancient pictures. Some go even further, and not only state that Eve ate an apple, but that when she gave the fruit to Adam to eat, it stuck in his throat, and hence the name "Adam's apple" applied to the thyroid cartilage of the larynx, which is more prominent on a man's than on a woman's throat.

That the Enigma on the letter H, beginning "'Twas whispered in Heaven, 'twas muttered in Hell," was written by Lord Byron

Elementary science is at a loss at last, and all we can say is, this is a fallacy because it is! If it is not, then find the article in Byron's works. We have never looked for it, but our friends have, and they failed to find it. It was really written by Miss Catherine Fanshawe, as you will see by page 83 of "Inquire Within," 98th edition, 1901; and Mr. Wilson, of Eastbourne, tells us Byron did not write it.

That Columbus discovered North America

We take the following particulars from the article on "Cabot" in "Encyclopædia Britannica":—"Sebastian Cabot, born about 1476 at Bristol, England. First patent granted March 5th, 1496 (11th Hen. VII.) to 'John Gabote, citizen of Venice; to Lewes, Sebastian, and Santius, sonnes of the said John.'" John and Sebastian sailed from Bristol in 1497. There is, in the account of the Privy Purse expenses of Henry VII., the following entry:—"10th Aug., 1497. To him that found the New Isle, £10." The most precise account of the discovery is from a map drawn by Sebastian Cabot, and engraved in 1549 by Clement Adams, which is known to have hung in Queen Elizabeth's gallery at Whitehall. The notice runs as follows:—"In the year of Our Lord 1497, John Cabot, a Venetian, and his son Sebastian, discovered that country which no one before his time had ventured to approach [Columbus had certainly *approached* it in 1492.—ED.], on June 24, about five o'clock in the morning. He called the land *Terra prima visa* [Newfoundland.—ED.], because, as I conjecture, this was the place that first met his eye in looking from the sea. On the contrary, the island which lies opposite the land he called the Island of St. John—as I suppose, because it was discovered on the festival of St. John the Baptist."

A second "patent" to John Cabot, dated February 3, 1498, authorised him to take six English ships, of not more than 200 tons, in any part of the realm, "and them convey and lede *to the land and isles* of late found by the said John in oure name and by oure command." John Cabot died, and Sebastian, with a fleet of five vessels, sailed from Bristol in May, 1498.

Cabot brought to England three native inhabitants of the countries he had visited. His great achievement was the discovery of 1,800 miles of sea-coast of the North American continent. Cabot is supposed to have died in London in 1557. The place of his burial is unknown, and we are indebted to Eden for the death-bed scene of this intrepid navigator, who saw the American continent before Columbus or Amerigo Vespucci.

From the article on "Columbus" in "Encyclopædia Britannica" we take the following:—"Christopher Columbus (c. 1436-1506) was born at Genoa. He set sail from

Palos, on the river Tinto in the south-west of Spain, with three ships on Friday, August 3, 1492. On Friday, October 12, 1492, was sighted the *island* called by the Indians Guanahani, and named by Columbus San Salvador! This has now been identified with Watling Island. On his third voyage he beheld, on Wednesday, August 1, 1498, for the first time, the *mainland* of South America, the continent he had sought so long. He does not appear to have landed."

From the article on "America" we excerpt the following: "It is singular that America should have been visited by one of the most enterprising nations of Europe five centuries before the time of Columbus [this implies that he re-discovered it!—ED.] without awakening the attention of either statesmen or philosophers. Iceland was discovered about 860, and colonised by the Norwegians in 874. About 50, or, according to other accounts, 100 years later, the same people planted colonies in Greenland. Whoever looks on the map of Greenland, and reflects on the fact that the Norwegians must have been ascending through Davis' Straits as high as the seventy-third parallel [where the *runic* inscription was found], annually, perhaps for two or three centuries, will admit that, with half the spirit of enterprise which had carried them so far, the discovery of some portion of the west coast of these straits was almost unavoidable. Now, the position and direction of this coast once known, it required no great effort to trace it southwards to Labrador and Newfoundland."

Dr. S. E. Dawson, F.R.S., of Canada, has also pointed out that it was Cabot, and not Columbus, who discovered North America; and there is a paper on the subject by Mr. Fleming, published in the "Journal of the Royal Colonial Institute" (January-July, 1869).

"Almost fourteen months before Columbus in his third voyage came in sight of the main . . . . he [John Cabot] discovered the western continent."—Bancroft, "Hist. United States," vol. i., page 9.

On page 11 of "Outlines of English Industrial History," by Dr. Cunningham and Miss McArthur, we read:—"We may learn how great their [the Danes'] prowess was from the records of their voyages to Iceland, Greenland, and *America* . . . ." While on page

114 of the same work the "re-discovery of America" is referred to.

Lastly, we may refer to page 36 of "The New Guide to Bristol and Clifton," edited (April, 1906) by Mr. James Baker, F.R.Hist.S., F.R.G.S, where it is stated that John Cabot and his son Sebastian "discovered and landed on the mainland of America." Further information is also given by the same authority.

That the following Popular Quotations are from the Bible

From *To-day* of November 9, 1895, we extract the following :—

"Among the popular quotations which are falsely attributed to the Bible are the following :—

'God tempers the wind to the shorn lamb.'—From Sterne's 'Sentimental Journey to Italy.'

'In the midst of life we are in death.'—From the Burial Service; and this was originally from Luther.

'The merciful man is merciful to his beast.'—The Scripture form is: 'A righteous man regardeth the life of his beast.'

'Money is the root of evil.'—Paul's version is: 'The love of money is the root of all evil.'

'Cleanliness akin to godliness,' not in the Bible; first used by Mr. Whitfield."

EXPLODED LEGENDS. By ALAN OSCAR.

"Exploded Legends," by Alan Oscar, in *To-day* of June 20, 1896 :*—

"Careless historical writers are responsible for many legends which, delightful in themselves, are no more 'history' than the story of Jack and the Beanstalk. The more critical methods of to-day have exploded many such stories, as, for example, that of William Tell and the apple, much to our loss, no doubt.

William Tell.

"We used to be taught—and, doubtless, are still in many places—that, until about six thousand years ago, there were no human beings on this earth of ours: modern Asiatic scholars tell us that Egypt's first *historical* king reigned at this date, and that before him are shadowy lists of many

* By kind permission of Mr. Jerome K. Jerome and Mr. Alan Oscar.

earlier monarchs; whilst Chaldean history has an actual recorded date of 3750 B.C. which is authentic, and it is known with certainty that the nation was in existence hundreds of years previously.

Belisarius. "One of the choice classical stories of our schooldays showed us the great Roman General Belisarius, in his old age, a beggar for the alms of the passers-by; whereas, in fact, he died in the enjoyment of all his wealth and honours, as was meet for him who held Italy for the Empire against the armies of the Goths.

Cheops. "Khufu, the Cheops of our boyhood, has been traduced as a despicable oppressor in that he compelled his people to build that stupendous pyramid which to this day remains the grandest monument ever erected; but more careful inquiry reveals the fact that it was, more probably, a 'relief work,' which found employment for a large number of men out of work by reason of the inundation of the country during the period of the overflowing of the Nile.

Cyrus. "Historical records rob us of the romantic story of the taking of Babylon. We used to be told of a war, a siege, an heroic defence; and, on the part of Cyrus, a stroke of genius by which victory was at last obtained—that at dead of night he turned the course of the Euphrates, and marched his army along the river bed; that revelry in the city on this annual feast-night had begotten carelessness; the river gates had been left open, and the Persian army marched in! Daniel, who gives us the dramatic scene of Belshazzar's feast, carefully omits all this, and he is right. The actual official records of the time fully confirm each other, and give us the true story. They tell of treason and revolt within the city, and voluntary surrender by the powerful priesthood, peaceful occupation, and a triumphal entry.

Sardanapalus. "So also with Sardanapalus, the 'last' King of Nineveh, whom Byron immortalised. According to 'history,' he was an effeminate tyrant, spending his life in the luxury and idleness of his harem; ending his days at the last by an heroic fight for his crown, and—being overpowered—burning himself and his wives on an immense pyre. His name was Assurbanipal; he was not the last King of Nineveh; he was a brilliant warrior and hunter; he overpowered Babylon and Elam, and, under him, the kingdom flourished in every way. It was at least twenty years after his death

that Saracos, the *last* King of Assyria, was defeated by the allied forces of Media and Babylon.

Saint Ursula.

"Coming to later times, we have all heard of the peculiarly chaste city of Cologne, Saint Ursula, and eleven thousand virgins. Unpitying criticism tells us that the legend is the result of misreading a Roman inscription, or, possibly, of a name, 'onesimilla,' which some wiseacre tortured into 'undecimmille'—eleven thousand. Fancy, eleven thousand virgins in a little town of those days! We have been taught to look on the Goths as ruthless destroyers of beautiful things, much in the same way that Cromwell is credited with the destruction of the images in our cathedrals. The truth is, that we are indebted to the great Theodoric, King of the Goths, for the preservation of many noble Continental buildings.

Goths.

"In the same manner it has been dinned into us that had not the Christian heroes stayed the influx of the Mahommedans, Europe would have been uncivilised to this day. But it does not follow. The only European civilisation worthy of the name before the Renaissance was in the Moorish kingdom, in Spain, where culture of every kind flourished, whilst the rest of Europe was just waking from savagery.

David Gwynn.

"Even in modern English histories we find these legendary myths. In the account of the defeat of the Spanish Armada we used to read—and still may do so—of a certain hero, David Gwynn, who is said to have captured a galley, *Basana*, after the vessel, *Diana*, in which he was a slave, had sunk. It is all a myth. The *Diana* drove on shore at Bayonne, and Gwynn escaped from her. He made his way to England, and, being able to speak Spanish, was sent to Ireland to assist in the examination of the Spanish prisoners. From thence he was expelled as 'a liar, thief, and lewd person.'

Waterloo.

"How many writers have, of late, disposed of the two Waterloo 'tags'—'The guard dies, but does not surrender,' and 'Up, guards, and at 'em!' Wellington's quiet 'Now, gentlemen, if you please,' sounds much more like truth.

"In the thirty-fifth century, our descendants may, perhaps, read how Sir Jameson Rhodes defied the full force of Germany, boldly marched into the Transvaal, and, with

a handful of noble British troops, rescued his fellow-countrymen from the vile hands of the Boers; and how Sir Alfred Austin raised himself, by his magnificent genius, to the proud position of Poet Laureate, completely overshadowing his somewhat effeminate predecessor, one Tennyson."

That the 7th, 8th, 9th, 10th, and 13th Books of Euclid are not extant

We believe that some of those who are of this opinion think that the Books in question were burnt in the Great Fire at Alexandria. The author has had a very old and complete edition of Euclid's works in his hands, and from this he transcribes the following:—

"The Elements
of Geometrie
of the most auncient
Philosopher
EUCLIDE
of Megara.

Faithfully (now first) translated into the Englishe toung, by H. Billingsley, Citizen of London."

There is a long preface by M. I. Dee, which he thus curiously ends:

"Written at my poore House
At Mortlake.
Anno. 1570. February 9."

The 7th, 8th, and 9th Books treat of numbers.

The 10th Book: "In this tenth Booke doth *Euclide* entreat of lines and other magnitudes rationall & irrationall, but chiefly of irrationall magnitudes, commensurable & incommensurable."

The 11th and 12th Books, as is well known, treat of solid geometry.

The 13th Book: "In this Thirteenth Booke are set forth certayne most wonderfull & excellent passions of a lyne devided by an extreme & mean proportion." It also deals with solid geometry.

There are also Books numbered 14 and 15, treating of geometry in general, but these are ascribed to *Appollonius* or *Hypsicles*.

Another complete edition which we have seen is in

Greek with a Latin translation. This also gives the 14th and 15th Books, and its title-page is as under :—

"EUCLIDIS OPERA OMNIA
ediderunt
I. L. Heiberg et H. Menge
LIPSAE.
in aedibus B.G. Teubneri
MDCCCLXXXIII."

The following paragraphs appeared in *Nature* of July 8, 1897 :—

"THE LOST BOOKS OF EUCLID.

"'Will you or any of your numerous readers kindly let me know, through the medium of your journal, if the lost books of Euclid (Books vii., viii., ix. and x.) have been found and published in English ; if so, the name of the editor and that of the publishing house?

"'I may say, in reference to this inquiry, that an Indian prince, who is at present in this country for the Jubilee celebration, possesses a complete copy of Euclid in Sanskrit —no book or books missing. "A. K. GHOSE.

"'6, Forest Road, Kew, June 8.'

[We are indebted to Mr. H. M. Taylor for the following information :—

"The first English translation of the Elements, published at London in 1570, had the title (16 Books) :—

"'The Elements of Geometrie of the most ancient Philosopher Euclide of Megara, Faithfully (now first) translated into the Englishe toung, by H. Billingsley, City of London. Whereunto are annexed certain Scholias, Annotations and Inventions of the best Mathematicians both of time past and in this our age.'

"The English edition of the first printed Greek text, published at Basel, contained all the extant works attributed to Euclid. This was published in 1703, at Oxford, by Dr. David Gregory, and was entitled '*Εὐκλειδου τὰ σωζομένα.*'"

See "Ency. Brit." for further information.—EDITOR.]

That Dr. Guillotine invented the Guillotine, and that he was the First to suffer by that Machine

"Some ascribe the invention of the machine to the Persians."

"Dr. Guillotine was born on May 28, 1738 ; recom-

mended the use of a machine for the purposes of execution on December 1, 1789, and this caused his name to be attached to it.

"It has often been stated that Dr. Guillotine perished by the instrument which bears his name, but it is beyond question that he survived the Revolution, and died a natural death in 1814."—"Ency. Brit."

The mention of "natural death" reminds us of the old lady on her death-bed and surrounded by medical men, saying, "Oh, doctors! may I die a natural death?"

Dr. Brewer tells us that the guillotine was used for the first time on April 25, 1792 (a highwayman named Pelletier being the victim, according to Mr. C. E. Clark), and that a somewhat similar and previous instrument was invented by Dr. Antoine Louis, and was called a Louisette. He shows also how the fallacy has arisen that states that the inventor was the first victim of his own invention, for it turns out that J. B. V. Guillotin, M.D., of Lyons, was guillotined (but he was not the first), while it was Joseph Ignace Guillotin, a French physician, who proposed the adoption of the instrument to prevent unnecessary pain.

Mr. C. E. Clark states that the guillotine was prepared by a German mechanic named Schmidt, under the direction of Dr. Antoine Louis, and was first called a Louisette. Mr. Clark also says that Dr. J. I. Guillotin was one of the founders of the Academy of Medicine in Paris, and that he died at the age of 76, on May 26, 1814.

That Watt was the Inventor of the Steam Engine

We all know the touching story of Watt's childhood, in which an egg-cup, tea-kettle, and grandmother are the "properties"; how he held the egg-cup in the jet of steam issuing from the spout of the kettle, saw the steam condense upon it, burnt his fingers, broke the egg-cup, and got into his grandmother's bad books for "being so idle," etc.

This thrilling story—we know one other, of George Washington's boyhood—no doubt is answerable for the fallacy under consideration.

Watt did *not* invent the steam-engine, but he greatly improved it. His greatest improvement consisted in having a separate condenser.

Prof. Unwin, F.R.S., has in his possession a photograph of a drawing of the Condensing Beam Engine erected by Messrs. Boulton & Watt, of Soho, Birmingham, for Messrs. Whitbread & Co., in 1785. Accompanying this photograph is a copy of the inscription on the engine, which is as follows:—

"The steam-engine was first invented by the most noble Edward Somerset, Marquis and Earl of Worcester, 1655. Improved by Captain Thomas Savery, 1699. Further improved by Thomas Newcomen and John Cawley, ingenious mechanicians, of Dartmouth, in the County of Devon, 1712.

"The expense in fuel reduced one-half by Mr. John Smeaton, F.R.S., of Austhorpe, in the County of York, civil engineer, 1768.

"Greatly enlarged in its powers and uses, and brought to its present state of perfection by Mr. James Watt, F.R.S., of the City of Glasgow, who received his Majesty's patent 1769, and in conjunction with Mr. Matthew Boulton, of Birmingham, F.R.S., obtained an Act for the exclusive privilege for twenty-five years, commencing 1775.

"They erected this engine, which performs the work of thirty-five horses, 1785. But in the course of ten years' use more power being found necessary, this engine was altered to make it equal to the work of seventy horses, 1795."

This engine was taken down in 1887 (to make room for a compound engine on Cowper's construction by Simpson & Co.), and we believe it is now in a museum in Australia.

There are two engines described in the "Pneumatica" of Hero of Alexandria (*c.* 130 B.C.), one of which worked on the same principle as "Barker's Mill," or a modern lawn-sprinkler. Between Hero and Somerset the names of three other philosophers occur in connection with the steam-engine, and they are, Giovanni Battista della Porta (1601), Solomon de Caus (1615), and Giovanni Branca (1629), the latter having invented the impact steam-turbine.

The foregoing evidence (and there is plenty more) should make it quite clear that Watt was not the inventor of the steam-engine, though it owes much of its early development to him.

That Galileo's Eyes were put out, that he was forced to wear a Hair Shirt by Order of the Ecclesiastical Court held in 1632, and that he uttered the Words "E pur si muove" as he rose after an Act of Outward Submission

That, to the eternal disgrace of his Romanist and Jesuitical persecutors, he was most shamefully treated we should be the last to deny; but, the actual treatment being so bad, there is no need to exaggerate, and we are only too pleased to be able to refute the story of his eyes being put out, though, to add to his final misery, he did gradually lose the sight of both eyes by disease, and, commenting on this sad event, Galileo said: "So it pleases God; it shall therefore please me also."

That Napoleon I. was the Author of the Phrase "a Nation of Shopkeepers"

Adam Smith used it in his "Wealth of Nations," which was written when Napoleon was seven years old. Dr. Brewer falls into this error, so does Wheeler in his "Names of Fiction."

That the Name of the Rich Man in the Parable of Lazarus and the Rich Man (St. Luke, chapter xvi., vv. 19 to 21) was Dives

"Dives in Mayfair" appeared as a headline in letters four millimetres high in the issue of the *Daily Mail* of June 18, 1906, and in the first six lines of the paragraph "Dives" occurs twice. The simplest way to prove the fallacy is to turn to St. Luke xvi., vv. 19 to 21, when it will be found that no name is given to the "certain rich man."

Few fallacies of the non-scientific type can be more satisfactorily explained than this one. In older times the episode of the rich man and Lazarus was a favourite subject for monks and others to paint, and the inscription was naturally enough in the "learned" language of the day, viz. Latin, and was thus "Dives et Lazarus," where, of course, "dives" means "the rich man," and the word would have been written with a small "d" had the inscription been "Lazarus et dives."

That the Original Cinderella wore a Glass Slipper

This deeply-rooted and pantomime-nurtured fallacy is one which can be convincingly explained. The "old original" Cinderella wore a fur slipper, a much more sensible foot-gear for a cold winter's night, especially when

you want to dance and get back home to time without your guardian being any the wiser! In the original French the words were "pantoufle en vair"; these by their sound were mistaken for "pantoufle en verre," and thus "fur" was changed to "glass."

That there was a particular Mountain named Ararat on which Noah's Ark rested after the Flood

On referring to Genesis viii., v. 4, we read that the ark rested on "the mountains of Ararat." Ararat was in fact a *district* which included some mountains, and these were spoken of as the "mountains of Ararat," just as we speak of the "mountains of the moon."

Fallacy of Traditions

How little reliance is to be placed upon the traditions repeated by vergers and guides to wondering sight-hunters, these few instances prove. They are by a Correspondent of "Notes and Queries," No. 130:—

"In spite of Sir Samuel Meyrick's judicious arrangement of the armour in the Tower, the Beefeaters still persist in the old stories handed down. At Warwick Castle, the rib of the dun cow is ascertained to be the bone of a fossil elephant; and Guy's porridge-pot, a military cooking-utensil of the time of Charles I. St. Crispin's chair, carefully preserved in Linlithgow Cathedral by insertion in the wall, is of mahogany—an American wood! The chair of Charles I., at Leicester, bears a crown, which, having been the fashionable ornament after the Restoration, together with the form, betrays the date. Queen Eleanor's Crosses, it now appears, were not built by her affectionate husband, but by her own direction and with her own money. The fireplace and other objects in Belted Will's bedroom in Naworth Castle are manifestly of later date. The bedstead treasured up near Leicester as that occupied by Richard III. immediately before the battle of Bosworth, is in the style called Elizabethan. Queen Mary's bed, at Holyrood, is of the last century; and her room at Hardwick is in a house which was not erected till after her death; the tapestry and furniture, however, may have been removed from the old hall where she was imprisoned. The tower of Carnarvon Castle, in which the first Prince of Wales is supposed to have been born, is not of so early a period.

Queen Eleanor's Crosses.

First English Prince of Wales.

"There does not appear to be the least ground for the tradition that Vauxhall, or Fauxhall, was the residence of Guy Fawkes, except the common coincidence of names. Jane Vaux, or Faukes, mentioned in the History of Lambeth as holding a copyhold tenement at Vauxhall in the year 1615, was the widow of John Vaux. The infamous Guy, or Guido, was a man of desperate fortune, and not likely to have a settled habitation anywhere, much less a capital mansion. It appears, however, that the conspirators of the detestable plot in which he was concerned held their meetings in Lambeth, at a private house, which was accidentally burnt in the year 1635."—Lysons.

That the Aphorism "Little Children, love ye one another," occurs in the Bible

The explanation of this mistake is practically the same as that concerning "God tempers the wind to the shorn lamb" (*q.v.*).

It has been ascribed to St. John in his old age. *Vide* Eusebius.

That Baron Münchhausen was the Author of the Book entitled "The Adventures of Baron Munchausen"

On referring to "Raspe, Rudolph Erich," in Haydn's "Dictionary of Biography," we find he was born in 1737, that he published anonymously "The Adventures of Baron Munchausen" in 1786, and that he died in 1794; while the same authority tells us that Jerome Carl Friederich Münchhausen (note the two h's in the name, while only one is given in the title of the book) was a German officer, born 1720, died 1797, whose boasting narrative of his exploits, intermingled with fables, was published in English by Raspe.

Dr. Brewer ("Dictionary of Phrase and Fable") adds that Baron Münchhausen was noted for his marvellous stories, and that the book was a satire either on Baron de Tott, or on Bruce, whose "Travels in Abyssinia" were looked upon as mythical when they first appeared.

That "The Vision of Piers the Ploughman" was written by one Piers

Dr. Brewer says the author is *supposed* to be Robert or William Langland, while Haydn's "Dictionary of Bio-

graphy" says, "Robt. or Will. Langeland is said to have finished the 'Vision of Piers Ploughman' in 1366," that it was not *printed** till 1550, and that the author died about 1370. The Rev. Stopford Brooke, M.A., in his primer of "English Literature," p. 38 *et seq.*, gives a full account of the book, and says: "Its author, William Langland, though we are not certain of his *surname*, was born about 1332," and that the text of it was probably written in the country in 1362.

That Alexander Selkirk (on whose Adventures Defoe founded "Robinson Crusoe") was shipwrecked on the Island of Juan Fernandez

Selkirk was a Scotch seaman, born about 1676, and he was *left* on the island by Captain Stradling in 1704, being provided with some food, clothes, weapons, ammunition and tools. He was taken off four years and four months later (February, 1709) by Captain Rogers, and brought to England. The whole incident is very similar to that of the two Stoltenhof brothers, who willingly took up their residence on Inaccessible Island, and after a precarious life there were taken off by H.M.S. *Challenger* when on her celebrated voyage. The author when in Cape Town (1875-1886) knew Mr. F. Stoltenhof (one of the two brothers), who was and still is a merchant there.

That Charles Darwin was the First to treat of the Origin of Species

Buffon (1707-1788) was the first in modern times to deal with this subject; then Lamarck (1744-1829). Then, in England, Dr. Erasmus Darwin—the grandfather of Charles Darwin; Geoffroy Saint-Hilaire, in France; and Goethe, in Germany, came to the same conclusion on the matter at practically the same time, viz. during the period 1794-5.

The most convincing evidence that it was not Charles Darwin is to read his own account of the facts in the "Historical Sketch" with which he begins his classical and celebrated work, "The Origin of Species," which was published in 1859, after he had devoted 22 years to the study of the subject! Even then, apparently, its publication was somewhat hurried, because Dr. Alfred Russell Wallace, F.R.S., had reached similar conclusions to those of Darwin

* Printing invented in Germany 1452, and introduced into England in 1477.

as to the origin of species. Charles Darwin's great discovery was a new and potent cause of the modification of species. He called the principle "Natural Selection," but himself preferred the name Herbert Spencer afterwards gave it, namely, "Survival of the Fittest."

Perhaps the reader will forgive a short story being introduced here into this otherwise jokeless book. The mistress asked her cook how she liked the new butler, and received the reply: "Oh, we like him very much; he explains things so nicely." "'Explains things,' Mary! what do you mean?" "Well, m'um, last night, for instance, he explained as 'ow we be all descended from Mr. Darwin."

That Dick Whittington came to London with a Domestic Animal called a Cat

Riley, in his "*Munimenta Gildhallæ Londonensis*" (page xviii.), says *achat* was used at the time for "trading" (*i.e.* buying and selling), and that Whittington made his money by *achat*, called *acat*. The same root appears in *cater*, *caterer*. Apparently, also, Whittington's *achat* was in coals, for coal was first brought from Newcastle to London in 1381, and in 1397 we find Mr. Richard Whittington was Lord Mayor of London. Furthermore, a ship used in the coal trade and built on Norwegian lines is called a "cat," and it is said that Whittington made his money by trading (*achat*) in coal conveyed in such a "cat."

Richard Whittington was Lord Mayor of London three times, and he died in 1423 when about 63 years old.

MYTHS AND ANECDOTES.

The following article appeared in the *University Correspondent* of October 12, 1895:—

"A learned writer in *The Spectator* is under the misapprehension that the field of school and college myths has yet to be explored, says the *Daily News*—'is entirely untrodden by the scientific investigator.' If this were so, the scientific investigator would not be worth his salt. Mythology, as Arbuthnot showed long ago, in his epoch-making treatise on Political Lying, pervades every province of human activity. The student must examine the whole discourse of mankind, including Common Room jokes. It is not (as the philologists did falsely boast), it is not the Aryan peoples alone who enjoy the mythopoeic faculty. Savages again,

though the earliest, are not the only, myth makers; nor are children, though every nursery is the cradle of innumerable myths. All men are mythopoeic, and the great general laws which govern the evolution of Egyptian, or Aryan, or Zulu mythology, are active in college rooms and quadrangles. One of these laws is Economy of Invention. There are but few original stories in the world, and of these (an American professor has remarked) only one can be told to ladies. The nations repeat them, and Quashee, lolling in the sun of Timbuctoo, laughs at the same *facetiæ* as Major-General Sir George Tufto enjoys in his club in Pall Mall.

"A noted instance is a fable about General Jackson; it has been traced to a manuscript of King John's reign, and is probably as old as war. Another myth, current about a modern Scotch citizen, is found in '*Le Moyen de Parvenir*' of Verville, and, generally, all smoking-room stories may be discovered in the French Fabliaux. Exactly the same remark holds good of ghost stories, and one of seemingly recent origin has had its pedigree traced to William of Malmesbury, shortly after the Norman Conquest. Thus the law of Economy of Invention is illustrated, or rather demonstrated. It holds good all round, and the story that is told of Odysseus, or Jason, or Heracles, in Greece, is told of Finnish, Samoyed, Samoan, or Algonquin heroes. The personal name is nothing, the anecdote is everything. All sound thinkers recognise this law in college myths. There is a story of a late Master of Trinity, Cambridge. So Lord Rosebery (himself of Christ Church) attributes it, in a speech, to Mr. Jowett, of Balliol. No new invention is needed; the new hero, simply and naturally, inherits the old myth. The *Spectator* has a story of Mr. Jowett hearing a number of anecdotes about himself, and saying: 'I told all those stories of my predecessor, except one, and that is not true.' To take an example, Mr. Jowett told, as of Dr. Scott, this anecdote, first observing that 'it was not true.' A man asked leave to go down, as his aunt was dead, to attend her funeral. 'I could wish, Mr. D., that it was a nearer relation,' said Dr. Scott. This myth has now become attached to Mr. Jowett's cycle; in 1865 it was current of Dr. Scott and a Balliol undergraduate who may prefer to remain anonymous.

"It is astonishing that a Balliol myth of 1750 has not,

to our knowledge, crystallised round Mr. Jowett. A Balliol man had ineffectually cut his throat. 'Tell him, if he does that again, I will sconce him five shillings at the buttery,' said the Master of 1750, or thereabouts. This was very like the late Master. Only Mr. Jowett could have said to the doubting undergraduate who 'could find no Deity,' 'You'll find him, or you'll go down before Hall.' And it was he who said, of a prominent person, whose simplicity of manner was praised, 'The simplicity of his manner and the duplicity of his mind are the making of him.' Yet the same Master, after a long walk with a hungry undergraduate, remarked, 'We'll send round to Cripps for a cold pigeon pie and a greengage tart, and have a jollification.' Now the man had meant to 'do himself very well' at the Mitre. So simply ascetic were the manners of the Master while still a tutor.

"It may be observed that most myths about Masters deal with snubs, more or less ingenious. Thus, a man took his papers after Greats to Mr. Henry Smith, who heard him with such urbanity that the youth thought himself sure of a First. 'And how will Brown do, sir?' he asked; now, Brown was his friend. 'Brown,' replied Mr. Smith, sweetly, 'Brown will be ploughed too.' Internal evidence assures us that the story is correctly attributed, but some new don may have inherited it by this time. Colleges have short memories. When Mr. Swinburne appeared, a comet in poetic skies, about 1865, no tradition concerning him survived at Balliol. The oldest scouts remembered nothing, unless it were a difficulty in getting Mr. Swinburne up in time for early chapel, and this could not be called a striking peculiarity. Nobody was ever remembered except 'Blades' (Mr. Calverley), whose fame is probably immortal. An undergraduate quoted Mr. Swinburne, in a Latin essay, as 'poeta ille noster.' 'Who is he—Milton?' asked Mr. T. H. Green, of philosophic reputation. 'Not Milton, sir—Mr. Swinburne,' was the answer; and Mr. Green only sniffed. Colleges know little of their greatest men, and 'know that little wrong.' As Zeus expelled Cronos, as the saints usurped the holy wells of the fairies, so the new dons appropriate the myths about the old dons, and Dr. Caird, of Balliol, will soon have his legend—just the ancient Balliol legend, dating from the time when Wiclif

was Master, if ever he was Master, which we leave to more accurate research.

"Now here the mythologist falls back on the method of psychical research, finds out the ex-undergraduate, and makes inquiries of him. If he cannot remember, the myth becomes, perhaps, as old as Dervorgilla, who founded the college. To call Mr. Jowett 'Dr. Jowett,' as the *Spectator* does, is to indulge in myth. The Master was not a Doctor. Folk-lore assigns the explanation that he would not sign the Articles. Yet myth adds that, about 1862, being asked by an opponent if he was ready to sign the Articles, he answered: 'Yes, if anyone will lend me a pen.' In each case, as the *Spectator* justly remarks, we must look for original testimony, and examine internal evidence. Where a Master says of a young fellow: 'The time which he can spare from the decoration of his person he devotes to the neglect of his duty,' we may, without hesitation, regard Dr. Thompson, of Trinity, as the speaker. Again, where a don says of the editor of *Nature*, that he would be thought arrogant even if he were the author of Nature, we recognise Mr. Henry Smith as the speaker, from internal evidence. The myth about Mr. Jowett and the Balliol laundresses (who complained that, as they 'washed for Scotch gentlemen,' their returns were inconsiderable) is probably true, and, in any case, is not older than Dr. Jenkins."

That St. Augustine was the First Person to introduce Christianity into Great Britain

St. Augustine landed in England in 597, but St. Alban had suffered martyrdom on account of his Christian faith nearly three hundred years before that date, and the three British Christian Bishops of London, York, and Caerleon (Wales) attended the Council of Arles in 314.

Constantine the Great (d. 337), who first made the Roman State Christian, is said to have introduced Christianity into Great Britain, and St. Columba (d. 597) converted the Picts in Scotland, his headquarters being in the island of Iona; while Aidan (Bishop of Lindisfarne; d. 651), who also came from Iona, taught Christianity in Northumberland and the North of England.

That St. Augustine was *not* the first is made *quite* clear

by Professor Cyril Ransome, M.A., on p. 17 *et seq.* of the 6th edition of his "Short History of England," and by Professor S. R. Gardiner in his "Outline of English History." Professor T. F. Tout, M.A., in "A Short Analysis of English History," p. 6, says: "The Welsh remained Christians from Roman times."

Lastly, we may refer the reader to vol. i. of "Illustrated Notes on English Church History," by the Rev. C. Arthur Lane, F.R.Hist.S., where the subject is very fully dealt with.

That the Correct Name of the Heroine of Orleans was Joan of Arc, or Jeanne d'Arc

The correct forms are Joan Darc, or Jeanne Darc, and in support of this we find that Professor S. R. Gardiner says: "Joan Darc, known usually in England, by a curious mistake, as Joan of Arc." The mistake, of course, is in supposing that the French form is d'Arc, instead of Darc (the d' meaning "of"). Professor Cyril Ransome, M.A., uses the form Jeanne Darc. Henri Martin, in his "Histoire de France," adopts the spelling *Darc*, instead of *d'Arc*, on the grounds that there is no such village as Arc near Domrémy (where the heroine was born), and consequently there is no sense in "Joan of Arc."

Others who have specially gone into this point are M. A. Vallet de Viriville and M. P. G. Dumast, both of whom adopt the form Jeanne Darc.

That Ethelred the Unready means "Ethelred the Unprepared"

The meaning of the word "unready" in this connection is "without counsel," and it should be spelled "unrede." Dr. Brewer and Professor Cyril Ransome, M.A. (p. 29), both give this meaning to the word.

That Wellington said, "Up, Guards, and at them!" at the Battle of Waterloo

Dr. Brewer ("Dictionary of Phrase and Fable") is quite pathetic on this point, and we feel sympathetic too, but as this book is for the purpose of correcting misapprehensions, we must carry out this object "without fear or favour."

Professors Gardiner and Ransome, Wood's "Dictionary of Quotations," and Maunder's "Treasury of History" do

not mention the incident, while under "Up" (page 1262), Dr. Brewer says: "It has been utterly denied by recent writers, but it is the fashion to deny or discredit all cherished traditions. [The author is blushing crimson!!] I, for one, wish the tradition were true, because, like Nelson's motto at Trafalgar, it gives a memorable interest to the charge; but, alas! we are informed that it was not the Guards, but the 52nd Light Infantry which broke the column of the French Imperial Guard in the final charge; and 'honour to whom honour is due.'"

Once realise it was not the Guards, and the whole thing becomes obvious. No one would argue that the Duke could have been ungrammatical, even under trying circumstances; hence to have used such a sentence at all he must have said to a *foot* regiment, "Up, feet, and at them!"—"which is absurd," as Euclid used to say!

In connection with the recent disbanding of a battalion of the Scots Guards, the *Daily Telegraph* of July 30, 1906, had a leading article, from which we quote the following: "They were at Waterloo when, at the crowning moment of that battle, the Iron Duke's voice was heard, firm and clear through the tumult, not with the theatrical 'Up, Guards, and at 'em!' but with the sterner and steadier command, 'Stand up, Guards!'" This, too, of course, is a mistake, according to the authorities we have named.

That Wellington said, "The Battle of Waterloo was won on the Playing Fields of Eton"

Dr. T. Miller Maguire, the well-known army coach, lectured on "Military Education in England" at the Royal United Services Institution on July 4, 1902, in the course of which he said: "We are often told that 'the battle of Waterloo was won on the playing fields of Eton.' Wellington never said anything of the kind, and he (Dr. Maguire) was certain that if the Duke had said it he would have been telling a lie. Yet it was used as a text by pedants for neglecting any kind of mental instruction whatever. Wellington himself never went to a playing school, nor have twenty of the most eminent officers in the British Army to-day. The place to learn how to win battles was the study, and not the playing ground."

We have failed to find any support for the common

belief, but while the sentence is not given in the "Dictionary of Quotations," Wellington is given as the author of "The next dreadful thing to a battle lost is a battle won."

That Sir John Mandeville wrote "The Marvellous Adventures of Sir John Mandeville"

Sir John Mandeville (or de Mandeville) was born about 1300, and entered the service of Sultan Melek Madaron in 1327. The account of his travels was published in French in 1480, in German in 1481, and in English in 1499 or 1503. He died November 17, 1372.

MM. Archibald Constable brought out a new edition of the "Adventures" in 1895, illustrated by Mr. Arthur Layard in the style of the fourteenth century. The *University Correspondent* of November 16, 1895, in referring to this edition, said: "The popular tradition of the authorship, we might mention, however, is now exploded, and it is supposed that the original of the work is not English at all."

That the Mot "The Most Learned Fool in Christendom" is due to Henry IV. of France

The first of the set of "Extra Prize Answers" in the *Journal of Education* for January, 1897, was the above, and it is pointed out that the expression was first applied by Sully to James I. of England, and that Henry IV. of France is sometimes credited with its authorship.

That Louis XVIII. of France was the Author of the Mot, "Il n'y a qu'un Français de Plus'"

No. 7 of the "Extra Prize Answers" in the *Journal of Education* for January, 1897, dealt with the above, and explains that the saying was fathered on Louis on the occasion of his restoration in 1814, and that the inventor of it was Beugnot, the Minister of Police.

That Æsop wrote "Æsop's Fables"

Dr. Brewer tells us that the celebrated fables were compiled by Babrios, a Greek, who lived in the Alexandrian age (A.D. 323 to 640), and that Æsop was a very deformed Phrygian slave and the writer of fables. He was contemporary with Pythagoras about B.C. 570. Some of the

fables attributed to him are said to have been taken from Egyptian sources dating back 800 years before the time when Æsop flourished.

That the Apostles' Creed is of Apostolic Origin

There seems no doubt it is *not* of such origin, but there *is* a doubt as to even the exact century in which it took its present form. "Encyclopædia Britannica" says:—"The tradition which ascribes it to the Apostles themselves has no authority, and does not reach beyond the fifth century, if it can be carried so far. The definite source of the legend is supposed to be two sermons spuriously attributed to St. Augustine, and found in the appendix to his works." The "Century Dictionary" says:—"The creed has been preserved in substantially its present form from the close of the fourth century, but in its precise wording from about A.D. 500."

That wonderful production for 6s. 6d., "Pannell's Reference Book," states that "the creed was probably embodied in its present form in the eighth century, though it has been traced, with some variations, back to the fourth century."

That the Athanasian Creed was written by Bishop Athanasius

Dr. Brewer states that it was so named because it embodies the opinions of Bishop Athanasius respecting the Trinity, and that it was compiled in the fifth century by Hilary, Bishop of Arles. "Pannell's Reference Book," on the other hand, says it was probably drawn up in the sixth century, *i.e.* about two centuries after the death of Athanasius. The "Century Dictionary" states that the authorship is unknown, and that it used formerly to be ascribed to Athanasius.

That the Name "Mount Calvary" occurs in the Bible

The only place where the word "Calvary" is used is in St. Luke, xxiii. 33, where we read, ". . . . to the *place* which is called Calvary"; while the Revised Version has it, ". . . . to the place which is called The skull." The capital C in St. Luke is a mistake, as the word is intended to translate the Hebrew word "golgotha," meaning a "place of skulls."

That King Charles I. of England was the Author of "Eikon Basilike" (The Royal Likeness)

Prof. Ransome says the book professed to have been written by King Charles. It gave an account of his life and meditations in prison, and produced such a reaction in his favour that Milton was engaged to answer it. Dr. Brewer says that John Gauden, Bishop of Exeter, claimed to be the author in a letter he wrote to the Lord Chancellor, in which he said :— "The 'Eikon' is wholly and only my invention," *i.e.* except the prayer put into Charles's lips the night before execution, which Gauden transported bodily from Sidney's "Arcadia," and which by "popular fallacy" was long ascribed to the Royal master by his admirers. "Pannell's Reference Book" states that Dr. Gauden was almost certainly the author, while Haydn's "Dictionary of Biography," under "Gauden," says that Gauden published the book a few days after the execution of King Charles, and that while the authorship was attributed to the King by South, Wordsworth, and others, Mackintosh, Lingard, Hallam, and Macaulay considered Dr. John Gauden to have been the author.

That William Tell shot an Apple off his Son's Head with a Bow and Arrow

This legend is fairly fully dealt with in the "Century Cyclopædia of Names." The story is one common to several countries, though it is best known as applying to Switzerland. In England it is fathered on to William of Cloudesley, and the legend is said to have been once common Germanic property.

That King John of England signed Magna Charta

We are told that at Madame Tussaud's there is a representation of the scene which occurred at Runnymede on June 15, 1215, and that King John is shown signing his name with a quill pen. The fact is, however, the "Charter of English Liberty" was not signed by John, but the seal was probably put on in the Chancery, which could say of most charters : "The King touched the parchment, and we did the rest."

That King Edward VI. of England was a Great Founder of Schools

The cause of this fallacy being popular is probably due to the fact that the well-known historian, J. R. Green,

author of "A Short History of the English People," supports the popular view. The balance of evidence is undoubtedly against the popular idea. As authorities we may name Mr. Arthur F. Leach's "English Schools of the Reformation." Edward VI.—he reigned only six years, and was only 16 when he died—was not only not a founder of schools, but a great destroyer of them, some 300 being suppressed under him and his father, Henry VIII. Another cause of the popularity of this fallacy is the fact that Edward VI. did found at least one very successful and celebrated school, viz. the Blue Coat School or Christ's Hospital, which was in Newgate Street, London, until 1902, when it was removed to Horsham, Sussex. Prof. John Adams, M.A. (Prof. of Education at the University of London), is another authority who opposes the popular idea; and Miss L. P. Steele-Hutton, M.A. (St. Andrews), writes (November 12, 1906):—"Edward VI. is generally regarded as a benefactor to education by the founding of grammar schools. The evidence is all the other way! He put an end to more than he founded, and some of those which bear his name were far older establishments which he permitted to continue. The little work which I have done in one county on this subject amply bears out what Mr. Arthur F. Leach says, speaking generally, of England."

Prof. Ransome says nothing about Edward VI. having founded schools, while Prof. S. R. Gardiner says: "Latimer, a bold preacher [Protestant], told the lords . . . . that they ought to make restitution to the poor. . . . In many towns *the merchants and shopkeepers* gave money to found schools which should be open freely to the poor."

That the Dark-skinned and Raven-haired People in the North-West of Scotland and Ireland are Descendants of some of the Shipwrecked Warriors of the Spanish Armada

Miss L. P. Steele-Hutton, M.A. (St. Andrews), writes (November 12, 1906): "This will not hold water as a theory, I believe, and yet one hears it constantly. Fair Island (between the Orkneys and the Shetlands) is the case which I really looked into, but anthropology seems to account for the race quite otherwise—as pre-Celtic, and perhaps even non-Aryan."

Vide also "The Origin of the Aryans" *(Contemporary Science Series)*.

That St. Peter was Bishop of Rome for 25 Years

Miss Steele-Hutton, M.A., has kindly dealt with this fallacy as follows :—

"There is no positive evidence against the common belief, but painfully little of an authentic nature to support it. Acts and Galatians (written when Peter was at Antioch) and I. Corinthians, ix. 5, are all the biblical references to him outside the Gospels.

"About the end of the first century, Clement of Rome says St. Peter was martyred, but no place is stated.

"During the second century, in the 'Preaching of Peter,' he and St. Paul are represented as being at Rome.

"Ignatius, in the Epistle to the Romans, says :—'I teach you not as did Peter and Paul; they were Apostles.'

"In 171 A.D., Dionysius of Corinth said :—'Peter and Paul planted together the Church of Corinth, and suffered martyrdom in Italy about the same time.' (N.B.—No evidence of this Corinthian foundation exists.)

"Irenæus said :—'Peter and Paul founded the Church of Rome.'

"In the third century, Tertullian said :—'Peter at Rome suffered a death like Christ.'

"In 228 A.D., Origen wrote :—'Peter was crucified head downwards.'

"In the fourth century, Lactantius stated :—'Peter and Paul preached at Rome. Nero crucified Peter' ('Of the Manner in which the Persecutors Died,' chapter ii., Ante-Nicene Library, vol. xxii.);

"'that tradition derived from the Apostles, of the very great, the very ancient, and universally known Church founded and organised at Rome by the two most glorious apostles, Peter and Paul.'—Irenæus, 'Against Heresies,' book iii., chapter iii., § 2.

"For criticism of this see 'History of Christian Literature and Dogma,' vol. i., chapter ii.—Dr. James Donaldson.

"The same authority, speaking of Clement of Rome, says :—'With regard to Peter, he states that he endured several troubles on account of jealousy, and that having borne his testimony he went to the due place of glory. It is questionable whether he asserts that Peter and Paul were

martyred at all. It cannot be proved that *μαρτυρέω* ("to bear witness") had acquired this meaning yet.'

"Ante-Nicene Christian Library, vol. ix., page 155 ('Fragments of Caius preserved in Eusebius,' 'Eccles. Hist.' ii., 25):—'And I can show the trophies of the Apostles. For if you choose to go to the Vatican, or to the Ostian Road, you will find the trophies of those who founded this church.'

"A foot-note says:—'The reference is to the Vatican as the traditional burial-place of Peter, and to the Ostian Road as that of Paul.'

"In the fourth and fifth centuries, Jerome said Peter was for twenty-five years Bishop of Rome. Jerome translated the Bible into Latin—the Vulgate edition—and his word went for much, especially when the idea was so satisfactory. Hence the statement '*Non videbis annos Petri*' made to each Pope at his installation, which partly accounts for the continuance of the fallacy."

That Julius Cæsar was an Emperor of Rome

He was a famous Roman general, statesman, orator and writer (his best-known existing work being his account of the Gallic War, so well known to all schoolboys). Miss Steele-Hutton tells me she has a fine seventeenth-century edition of Cæsar, containing the "Gallic War" and the "Civil War," and also "Fragmenta" from his letters to Cicero. But he was never emperor, though probably he would have been made such had he not been murdered by Brutus and the latter's friends.

As an illustration of the fact that the fallacy is firmly rooted, we may give the following quotation from a second-hand book list just published:—

"947. Roman Emperors.—Lives of, being exactly collected *from Julius Cæsar* until Ferdinand II., with their Actions and Deaths, 12mo. calf, 4s. Printed at the Signe of the Sun, within the Turning stile in Holborne, 1636."

That Flora Macdonald was a Poor Wandering "Lassie"

She will be remembered as the Scotch heroine who assisted "Prince Charlie" to escape to and from Skye after the battle of Culloden Moor. The manner in which her assistance was rendered should make it at once apparent that she was *not* in poor circumstances, for she dressed Prince Charles

Edward up as an Irish spinning-maid, and took a manservant with her as well. A *poor* lassie with a manservant and maid would have attracted attention and led to discovery. This incident which has made her famous occurred in 1746, and, according to Miss Steele-Hutton, Flora Macdonald was only about thirty-six hours with Prince Charlie, but she saved his life and made her mark in history in that brief time. She was born in 1722, married in 1750, went to North Carolina in 1774, returned to Scotland in 1779, and died in 1790. Her husband became a brigadier-general in the British army.

Flora Macdonald was a daughter of Ranald Macdonald, farmer (tacksman), of Milton, in South Uist, was educated by a private governess and at a boarding school in Edinburgh. On June 27, 1746, at 10 a.m., Flora, the disguised Charles, and a manservant set sail over the Minch to Skye, and spent the night in her relative's house at Monkstadt, in Skye. Next day they went to Portree (between twenty and thirty miles), when the Prince took boat to the mainland and they parted.

That Christ was born in the Year 1 A.D.

We use the symbols B.C. to indicate the years before the birth of Christ, and A.D. to indicate those after his birth. Hence it is natural and rational to suppose, as did Dionysius Exiguus in the sixth century, that Christ was born on December 25 of the year 1 A.D. ; but more careful examination of chronology has led to the conclusion that Christ was born in the time of Augustus, the first Roman Emperor, B.C. 4. So that the error is due to Dionysius.

It is interesting to note that astronomers call the year before 1 A.D. the year 0, and the year before that they call 1 B.C., an undoubtedly more scientific method. Hence, by their system (and if no mistake had been made by Dionysius) the date of the birth of Christ would be given as December 25 of the year 0.

That the Art of Printing was first practised in England in 1474, and that the First Book printed in England was "The Game and Playe of Chesse"

We believe we should not be far wrong in saying that many think that Caxton *invented* printing. This, too, would be a popular fallacy.

"The Game and Playe of Chesse" was translated by Caxton from the French, and he had it printed in 1475, probably by Colard Mansion in Bruges, for Caxton did not leave Bruges (where he learnt the art of printing) till 1476. He then returned to England and *published* "The Game and Playe of Chesse." It was not till 1476 that Caxton set up his printing press in Westminster, so, obviously, the above-named book could not have been printed there. This book was not even the first (but the second) printed in the English language, for that was Caxton's translation of "Recueil des Histoires de Troye," which he completed in 1471, and which was published in 1474.

The first book printed by Caxton in England was his "Dictes or Sayinges of the Philosophers," which appeared in 1477. Prof. T. F. Tout, M.A. (page 61, "Analysis of English History"), says:—"1477, William Caxton introduced printing into England"; and Haydn ("Dictionary of Dates") and the "Cyclopædia of Names" confirm the account here given.

In conclusion, we will give the following quotation from Dr. Brewer's "Dictionary of Phrase and Fable":—

"It is a mistake to suppose that Caxton was the first printer in England. A book has been accidentally discovered with the date 1478 (Oxford). The Rev. T. Wilson says: 'The Press at Oxford existed ten years before there was any press in Europe, except those at Haarlem and Mentz. The person who set up the Oxford Press was Corsellis.'"

The name Corsellis is not given in the "Cyclopædia of Names."

That Henry of Monmouth, the "Madcap" Son of Henry IV. of England, was sent to Prison by Judge Gascoigne, and that afterwards when Prince Henry became Henry V. he praised Gascoigne for his Action

Maunder, in his "Treasury of History," gives the popular version; but Prof. Cyril Ransome, M.A., does not mention either incident, while Prof. S. R. Gardiner says:—"No real evidence in support of the story, though not altogether without foundation."

Mr. C. E. Clark is very decided about the story being untrue, saying, indeed, that the tale did not appear till 150 years after the alleged incident. The "Cyclopædia of Names" throws considerable doubt on the story, for under

"Gascoigne" it says, "According to tradition he committed Prince Henry to prison"; while under "Henry V." it says, "He is said on doubtful authority to have been wild and dissolute in his youth." The Plea Rolls contain no record of the committal. The fallacy is completely disposed of in the "Transactions of the Royal Historical Society," New Series III., p. 47.

The fallacy is, of course, kept rolling by Shakespeare's account in the second part of Henry IV., act v., scene 2.

That the Duke of Clarence (Brother of Edward IV. of England) was put to Death by being drowned in a Butt of Malmsey Wine

Mr. C. E. Clark, while agreeing that the Duke was made away with in the Tower of London, says there is absolutely no evidence to support the popular story. Professors Ransome and Tout do not mention the wine incident. Maunder gives it in full detail. Professor S. R. Gardiner says no one really knows how he was killed; while the "Cyclopædia of Names" says, under "Plantagenet, George, Duke of Clarence":—"According to an unauthenticated tradition, he was drowned in a butt of Malmsey wine."

That Jane Shore, Mistress of Edward IV. of England, died in Poverty and in a Ditch, thus giving the Name "Shoreditch" to a Borough of London

On this point the "Cyclopædia of Names" remarks:—"The agonising details of her death in a ditch from starvation are without authority, though the old ballad gives them with great precision."

The ballad (written in the seventeenth century, while Jane Shore died in 1527) has:—

> "I yielded up my vital strength
> Within a ditch of loathsome scent,
> Where carrion dogs did much frequent."

Another argument against the fallacy is the fact that after Edward IV.'s death she was taken care of by Lord Hastings, and some time after he was beheaded she was cared for by the Marquis of Dorset. Thus we see she had several "friends at Court," which, being a considerable commercial asset, was not likely to lead to the death alleged.

Dr. Brewer does not support the popular version.

That Savonarola was a Protestant Reformer

He was a reformer, being chiefly known for bringing about a religious revival by his denunciation of the vice and corruption prevalent both in the Roman Church and in the State (Italy). He was born in Italy in 1452, and was executed in 1498 at the instance of Pope Alexander VI., whom he had denounced. His own writings clearly show he never wavered in his adherence to the Church of Rome, and, consequently, he could have been no Protestant Reformer.

That the Pilgrim Fathers emigrated direct from England to North America

Maunder and Gardiner give no information on the point, but Prof. Cyril Ransome says:—"In 1608 a body of Nottinghamshire Independents left England, and settled at the town of Leyden in Holland. After a time they thought they should prefer a country life, and in 1620 they sailed from England to America in the *Mayflower*." Thus the long period of twelve years intervened between their leaving England and arrival in America, for, according to Mr. C. E. Clark, they only called for friends at Southampton on their way from Holland to America. Notice also that the place of call was Southampton, for the *Mayflower* is usually described as leaving from Plymouth.

That Horatius defended the Sublician Bridge over the Tiber with the Aid of Two Friends

'Tis indeed sad to see all these pretty stories picked to pieces, and the author—though he doubts whether his readers will believe him!—is really dropping a tear over this one, for in his childhood he had a great love for anything Roman. Roman history, a Roman wall or road, would thrill him with admiration for that wonderful people, concerning whom his father taught him much. This being so, it can be easily understood how fascinated he was by Macaulay's poem on the defence of the bridge by "Brave Horatius." To learn now that his other name was Cocles, meaning "one-eyed," is alone enough to knock all romance out of the story which Maunder states briefly and without contradicting it. The "Cyclopædia of Names" speaks of him as a Roman *legendary* hero, and Mr. Clark is very definite on the subject matter of the story being a myth.

That Scævola entered the Camp of Porsena and held his own Right Hand in a Fire until it was burnt off

Alas! another Roman anecdote of heroism is dashed to the ground. Dr. Brewer gives the usual story, and its origin seems to be accounted for by the fact that the meaning of the Latin word "Scævola" is "left-handed." The "Cyclopædia of Names" gives the tale as a legend.

That the Black Prince was knighted on the Field of Crecy

Prof. Oman makes the mistake of thinking the Prince was so knighted, in his "School History," pages 187 and 188; but Dr. McKinnon ("History of Edward III.," page 287) gives the correct version, which is that the Prince fought in a skirmish that took place immediately after his landing at La Hogue, and he was then knighted by his father. The origin of the fallacy is probably due to Edward III.'s alleged remark about his son (the Black Prince) when someone asked for aid to be sent to the Prince. "No," said the King, "let the boy win his spurs." Professors Gardiner and Ransome say nothing about the Prince being knighted on the field.

That Fair Rosamond was offered by Queen Eleanor (Wife of Henry II. of England) a Dagger or a Bowl of Poison as a Choice of a Means of Death

Rosamond Clifford, better known as "Fair Rosamond," died peaceably at Godstow Nunnery, near Oxford, about 1176. One most convincing argument that Queen Eleanor did not stab or poison her, is the fact that Queen Eleanor was put into prison (by her husband for intriguing against him) in 1173, and she remained there till Henry's death in 1189. If the poison were given before the Queen went into retirement, then it must have taken a very long time to act! Haydn's "Dictionary of Dates" supports the fallacy by saying that Rosamond died "by poison given to her by Queen Eleanor at Woodstock in 1177"; while Mrs. Roe (page 76, "Sketches from English History") points out the fallacy, though she falls into others, namely, that William Longsword, and Geoffrey, Archbishop of York, were sons of Rosamond, which they were not.

Rosamond's Bower is also a myth, as is stated by the "Cyclopædia of Names," which also points out the error

in connection with Longsword and Geoffrey. Strangely enough, while Maunder makes the mistake regarding this parentage question, he is very definite on the other point, as the following quotation from chapter xx. shows:—"Of all that romance, whether in its own guise or in that of history, has said of this lady, nothing seems to be true save that she was both fair and frail. Her bower at Woodstock, and the pleasant choice offered to her, by the jealous Queen Eleanor, between the dagger and the poisoned chalice, are mere inventions."

That the S.S. "Sirius" and "Great Western" were (in 1838) the First Steamers to successfully cross the Atlantic

Mr. J. W. C. Haldane, M.I.M.E., in his "Life as an Engineer," thus deals with the above fallacy:—

"It is believed by most people that the *Sirius* and *Great Western* were, in 1838, the first steamers to successfully cross the Atlantic; this, however, is a fallacy. In the year 1831, aided by a Government offer of 12,000 dollars, the 'Quebec and Halifax Steam Navigation Company' was formed, having amongst its list of shareholders the names of Samuel, Henry, and Joseph Cunard. So much prosperity had attended their vessels, that designs had been prepared for the 'largest and swiftest vessel afloat,' which was at once begun, and eventually launched on April 27, 1831, under the name of the *Royal William*, her engines of 200 nominal horse-power having in the meantime been constructed by MM. Bennett and Henderson, of Montreal. . . . . After successfully running locally for some time, it was decided to send the *Royal William* to England, and she accordingly sailed from Quebec on August 5, 1833, arriving at Picton, Nova Scotia, on the 8th. From this port she sailed on the 18th for London, where she arrived after a passage of nineteen days, including two days' detention at sea. . . . The *Sirius* and *Great Western*, in 1838, made their famous passages from Cork and Bristol to New York in eighteen and fifteen days respectively."

That George Stephenson invented the Steam Locomotive

Henry Frith, in "The Romance of Engineering," page 189, says:—"Trevithick had initiated the steam-horse, Hedley had improved it, and Stephenson had adapted it,

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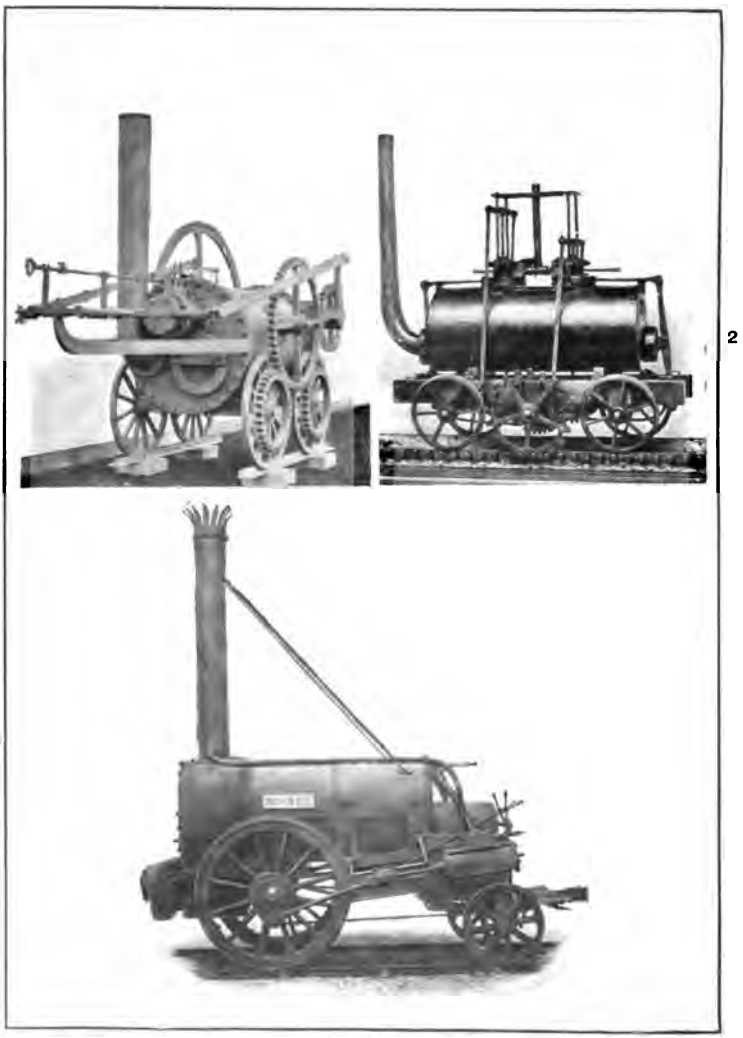


EARLY ENGLISH LOCOMOTIVES.

1. TREVITHICK'S TRAM LOCOMOTIVE. 2. BLENKINSOP'S ENGINE. 3. THE ROCKET.

Trevithick had unfortunately failed in obtaining recognition for his high-pressure engine. Blenkinsop ran his locomotive in 1812 ; and in 1813, William Hedley, who had already been engaged on the locomotive steam engine, took out a patent for his smooth-wheeled engine."

Samuel Smiles, in his "Life of George and Robert Stephenson," devotes chapter v., beginning on page 63, to the "Early History of the Locomotive—George Stephenson begins its Improvement." The last word at once explains that Smiles did not consider Stephenson the inventor ; in fact, this will soon be plain to anyone who looks into the matter.

Though Mr. H. Frith starts above with Trevithick, Smiles states that the first locomotive steam carriage was built at Paris by the French engineer Cugnot, the model of it having been made in 1763. In 1772 an American, Oliver Evans, invented a steam carriage. In 1784, William Symington was at work in Scotland on the same subject ; and in the same year William Murdock, friend and assistant of Watt, constructed his model of a locomotive. Then came Richard Trevithick, Murdock's pupil. Stephenson carefully studied everything that was being done in the matter of steam locomotion in his own time and before, and then set to and completed his first locomotive in 1814.

That Liberty Bell (in Independence Hall, Philadelphia, Pa., U.S.A.) was cracked when being rung on the Declaration of Independence on 4th July, 1776

The history of this bell—like that of all belles—is interesting. It was cast in London in 1752, and was sent to America in the *Matilda*. After being hung it was found to be cracked, thus necessitating recasting. The first time this was done the result was not satisfactory, so it was recast a second time (also by Pass and Stow, of Philadelphia). It was the first bell rung on the Declaration of Independence on July 4, 1776, but it was not cracked until when it was tolled for the death of Mr. Justice John Marshall, who died on July 6, 1835.

Its weight is 2,082 pounds. It cost £198 in London, and Pass and Stow were paid £60 13s. 5d. for the two re-castings. It is now, of course, considered priceless by Americans.

That King Alfred of England allowed certain Cakes to burn

Maunder's "Treasury of History," page 87, gives the popular story, which we remember seeing represented at the Adelphi Theatre, London, a few years ago, when the late Wilson Barrett was acting there in "The Christian King." Maunder, however, gives the following foot-note on page 88:—"On the source and value of this anecdote, see Lappenberg's 'History of England under the Anglo-Saxon Kings,' vol. ii., page 55, note 2."

Prof. Meiklejohn also gives the story, but Prof. Cyril Ransome does not.

Vide also the writings of Froude and Tom Hughes, and Francis Palgrave's "History of the Saxons," Freeman's "Norman Conquest," and Mathew Paris's "Chronica Majora," vol. i., page 411.

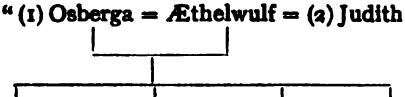
Freeman, *op. cit.*, page 121, says:—"The story has got into some copies of Asser's 'Life of Alfred' from the book called Asser's 'Annals,' which is undoubtedly a forgery. Most likely it comes from some life of Saint Neot, the author of which was anxious to exalt the saint and did not mind how unfair he was to the king."

The "Cyclopædia of Names" says:—"The popular accounts of his life abound in legends which are devoid of historical foundation"; while Hallam says:—". . . . his fame has become almost as fabulous in legislation as that of Arthur in arms."

That King Alfred of England, when a Boy, won a Prize alleged to have been offered by his Mother to the First of her Three Sons who should be able to read a Book of Saxon Poems, the Prize being the Book itself

To begin with, the story should refer to King Alfred's stepmother, though one historical writer goes so far as to preface the popular story with the statement:—"Like many other remarkable men, he was the son of a clever woman. . . . She possessed a book of Saxon poems . . . etc." Miss Steele-Hutton, M.A. (St. Andrews), gives the following note and quotation on the subject:—

"(1) Osberga = Æthelwulf = (2) Judith of France, aged 12 years.



Æthelbald Æthelbert Æthelred Alfred.

"Æthelwulf was an old man when he married Judith, and he died four years later. Then Judith married her stepson Æthelbald!!

"Alfred was seven years old when Judith married his father, and you cannot imagine her acting as a patronising lady to stepsons (or brothers-in-law!) about her own age or older, and offering a book prize to them. Osberga died when Alfred was too young to win a prize for anything except squalling."

Freeman, in his "Old English History," 1869 edition, page 115, says:—"Now, it is a great pity that so pretty a story cannot be true. . . . Alfred was sent to Rome to the Pope when he was four years old; and if the Pope took him as his 'bishop-son' and anointed him to be king, one cannot help thinking that he would have him taught to read and to learn Latin. And it is quite certain that he could do both very well in after-life. Still, this is not quite certain proof, as he might have learnt afterwards. But this is quite certain: Alfred was not twelve years old till 861. By that time his brothers were not children playing round their mother, but grown men and kings, and two of them, Æthelstan and Æthelbald, were dead. Moreover, in 861 Alfred's father, Æthelwulf, was dead, and his mother must have been dead also, as Æthelwulf married Judith in 856, when Alfred was only seven years old. If then anything of the kind happened, it could not have been when Alfred was twelve years old, but before he was four. For in that year he went to Rome, and could never have seen his mother again, even if she were alive when he went. And for a child of four years old not to be able to read is not so very wonderful a thing, even in our own time."

A footnote adds that two attempts were made to get out of the difficulty:—

"(1) *Osberga (Alfred's mother) was not dead when Æthelwulf married Judith.*

"No proof exists of this, and it is unlikely, when Æthelwulf was always on good terms with the Church. Apart from this, too, when Alfred was twelve, two of his brothers were dead and the other quite grown up.

"(2) *The story is true as relating to Judith, Alfred's stepmother.*

"Again we must repeat that when Alfred was twelve,

two brothers were dead and one grown up. Judith herself was only twelve when she married Æthelwulf, and his two eldest sons were much older than herself. Finally, in 861 (when Alfred was twelve) not only was Æthelwulf, her first husband, dead, but also his son Ethelbald (whom she married next), and she herself had returned to her father's Court in France."

That Adam and Eve were turned out of the Garden of Eden because they ate of the Fruit of an "Apple" Tree.

It is, indeed, hard to understand how this misconception has arisen, for the language of Genesis, chapter iii., verses 17-24, could not very well be plainer. On referring to that chapter the reader will see at once that while there were several punishments for their disobedience, being expelled from the garden was not one of them. Verses 22 and 23 are equally clear as to what was the reason for their banishment, for they say:—" . . . and now, lest he put forth his hand, and take also of the tree of life, and eat, and live for ever; therefore the Lord God sent him forth from the garden of Eden, to till the ground from whence he was taken."

That Lady Godiva, Wife of Leofric, Earl of the Mercians, rode naked through the Market Place of Coventry

The "Cyclopædia of Names" refers to this as a legend, and so also to the addition concerning "Peeping Tom."

Miss L. P. Steele-Hutton, M.A. (St. Andrews), writing on February 24, 1907, says:—"Her husband was not the brutal tyrant that the story describes, but was loved by his people, and founded Coventry Priory, as well as many other religious houses. Freeman calls him the 'Grand old Earl of the Mercians.' The whole story is unsupported by evidence, even by probability, and the 'Peeping Tom' portion of it was added long afterwards to the original fallacy."

FALLACIES CONNECTED WITH TECHNICAL AND SCIENTIFIC MATTERS

FALLACIES CONNECTED WITH TECHNICAL AND SCIENTIFIC MATTERS

That a Hollow Column is capable of supporting more than a Solid one of the same External Diameter

THERE is a saying that "there is no smoke without a fire," and doubtless this error has arisen from the fact that *under certain conditions* a hollow column is stronger than a solid one of *the same net cross-sectional area*, but it is absurd to think that if you take, say, a cast-iron column of one foot external diameter, and then bore a hole of, say, four inches diameter down the centre, from end to end, you strengthen the column.

In the case of a long column to support a vertical load, if you are limited to a certain cross-sectional area or weight of material, you will obtain a column which will have more *lateral stability* (*i.e.* resistance to bending sideways), as it is technically called, by making the column in the form of a hollow cylinder; but here again special knowledge is required to know how large to make the hole in the centre for a given cross-section and height.

Similarly, if a wrought-iron girder (beam) be required to support a vertical load at the centre, while it is itself supported at the ends, the most economical result will be obtained by adopting a hollow section or its equivalent.

That if a Match were struck inside a Gasometer full of Gas the Gas would Explode

A gas explosion may be defined as the rapid combustion of a quantity of gas mixed with a certain amount of air, the mixture being confined, or partially confined, as in a room, or cylinder of a gas-engine. Now, combustion usually means the combination of an inflammable substance with oxygen, one of the two most important gases of which the air is formed. Hence, if no oxygen (or air) be present, it is impossible for combustion, and, therefore, an explosion, to take place. Even the match itself would not light but for the fact that either it, or the substance on the box on

which it is struck, has potassium chlorate and manganese dioxide in its composition, and these substances contain oxygen sufficient to start the match in life ; but if, after this, it cannot obtain oxygen for itself, it comes to an untimely end.

That if a rope of one square inch cross-section be tied to a hook in a wall, and a man pull the end of it with a force of 100 lb., then the stress on the rope is 100 lb. per square inch ; but that if two men, one at each end of the rope, pull against each other, each with a force of 100 lb., then the stress is 200 lb. per square inch

In the first instance the stress *is* 100 pounds per square inch, but it must be noticed that, in accordance with Newton's Third Law of Motion (" Action and reaction are equal and opposite "), the wall pulls the rope with a force of 100 pounds, just as much as the second man does in the second case, though—unlike the man—it is incapable of " taking up the slack " if the man move towards it. Hence, we see that in the second case, the second man merely takes the place of the wall, and no portion of the rope is subjected to a greater tension than 100 pounds per square inch as in the first case.

That in the case of a Tidal Dock (or Lock) the Pressure on the Dock Gates (or Lock Gates) is Greater when there is a number of Ships in the Dock (or Lock)

The mean fluid pressure on any surface is proportional to the depth of the centre of gravity of that surface below the level of the fluid, and the mean pressure in pounds per square foot on the surface is equal to the product of this depth in feet into the weight in pounds per cubic foot of the fluid.

Now, suppose that at high tide, when the dock gates are open, the depth of water in the dock is 30 feet, and that the dock has no ships in it. Let the gates be closed, and when the tide has fallen so that there is no water on the outside of the gates, calculate the mean pressure of the water on the gates, multiply this by the area in square feet of the entrance to the dock, and the result is the total force in pounds, tending to burst the gates open.

Now, at the next equally high tide (*i.e.* when there are 30 feet of water in the dock), instead of closing the gates

with the dock empty, float in a ship or two. As the ship passes in, a volume of water flows out, and this quantity is equal in *volume* to the volume of hull of the ship *below the actual water line*, and is equal in *weight* to the weight of the ship.

If this were not the case, the water would rise in the dock to a higher level than the sea outside; but this is impossible with the gates *open*. [It would do so if the gates were first closed, and then the ships lifted bodily over the quay into the dock.] Hence, we see that whether the ships be in the dock or not, the height of the water is the same, and hence the pressure on the gates is the same. If there be any difficulty in seeing "where the weight of the ships has gone to," then try to realise that the total weight of the water in the dock in the first case is equal to the weight of the water in the dock, *plus* the weight of the ships in the dock in the second case.

In the case of a lock, account has to be taken of the fact that there is water on both sides of the gates, that on one side opposing that on the other, so that the force tending to burst the gates open is the difference between these two forces.

That Gas-Engines are for Making Gas

As a coffee-mill is for grinding coffee, a cotton-machine for making cotton thread, and a brick-machine for making bricks, it is not unnatural that some should think a gas-engine is for making gas. When the author was "in the shops" of a gas-engine firm some years ago, a lay friend came to see over the works, and after admiring the fine engines, he inquired: "But what do you do with all the gas when it is made?" We had to explain that not only did we not make gas, but that our quarterly gas bill was very high, owing to the quantity we consumed for driving the engines while testing them before they were sent out.

Of course, the facts of the case are that an explosive mixture of coal-gas and air is introduced into the cylinder of the engine, this charge is exploded at the right moment, and the pressure of the gases thus engendered (owing to their expansion) acts on the piston in a similar manner to that in which the steam pressure in the cylinder of a steam-engine acts.

That the Technical Terms "Stress" and "Strain" are Synonyms

If you take a straight piece of spring steel of small cross-section and bend it slightly, the deformation from its original condition is called a strain. If it were a piece of soft steel, and you bent it so that on being released it did not recover its original form, you would be said to have permanently strained it. So we see that a strain is a change of form of some body, and something we can *see*. Now, when you bend the steel you set up certain forces between the particles (atoms) of it, and it is these forces (reckoned on unit area, which is usually one square inch) which are called the stresses, and these we *cannot* see, we merely see their effects (the strains).

For example, suppose a steel bar one square inch in cross-section and 10 feet long, fixed vertically by one end to the roof, and the other end fashioned into a hook. Now, consider a transverse section just above the hook, this has practically no load on it, consequently, we may say the stress is zero. Now measure the total length of the bar very carefully (this should be done with a cathetometer measuring to the one-thousandth of an inch at least), then hang on a load of 2,000 pounds. Measure again, the bar will be found to have stretched very slightly; the amount of this stretch is called the *strain* [visible]. The load on the cross-section considered is now 2,000 pounds, and as the cross-section is one square inch, therefore the *stress* [invisible] is said to be 2,000 pounds per square inch.

If the cross-sectional area were 1½ square inches and the load were 3,000 pounds, then the *stress* would still be the same, but the force on the bar (sometimes erroneously called the total stress) would be 3,000 pounds.

The author regrets that these terms are very carelessly used by many of those who should know better, viz. his brother engineers; and if this paragraph induces any of these erring members of the family of men of metal to see that there is a very great and *convenient* difference between these two terms, then he will not have laboured in vain.

The confusion may have arisen from the fact that within the elastic limit of a material the strain is proportional to the stress; that is to say, a load of 4,000 pounds would elongate our bar twice as much as a load of 2,000 pounds. This is known as Hooke's Law.

That the Technical Terms "Force," "Power," and "Energy" are Synonyms

Here again, some of the author's professional brethren—or shall we say the quacks of the profession?—are to blame, though not to such a great extent as in the use of the terms "stress" and "strain."

The simplest illustration we can give of a force is this:—Suppose a hook fastened to a beam in the ceiling, and that we hang a ten-pound weight on that hook, then we say a force of ten pounds is acting vertically downwards, tending to pull the hook away from the beam. Hence we see that a force may act on a body *without producing any motion* of that body, though one definition of a force is "that which changes or tends to change the motion of a body." Any moving body must have (or have had) one or more forces acting upon it; but we may have a body with several forces acting upon it *without there being any movement* of the body.

Work is done when a force acts on a body and *causes that body to move in the direction of the applied force.* Hence, work is done when we lift a weight of, say, twenty pounds vertically upwards for a distance of three feet, for our hand applies a force of twenty pounds to the handle of the weight, and causes the body (lump of iron) to move through the distance of three feet, and $20 \times 3 = 60$ foot-pounds of *work* are said to have been done; in fact, work is the product of the force causing the motion into the distance moved by the body. It is very important to remember that *there is no work done unless there is motion.*

We have had to define "work" carefully, in order to define *power*, which is the "rate of doing work," *i.e.* work divided by time. Hence, if we lift a sixty-pound weight three feet high, and take exactly two minutes to do it in, we are said to have exerted a *power* of $\frac{60 \times 3}{2} = 90$ foot-pounds, per minute.

[A horse-power is empirically defined as 33,000 foot-pounds per minute, while a kilowatt is very nearly $= 1\frac{1}{3}$ h.p.]

Lastly, the *energy* of a body is its *capacity for doing work*, and it is measured in the case of a body in motion by the product of half the *weight* of the body into the *square* of its speed, while in the case of a body at rest, its capacity

for doing work is measured by the product of the weight of the body into the vertical distance it could fall. It can be easily shown that either of these results are quantities of *work*, and can, therefore, be reduced to the same dimensions as "work," *i.e.* to foot-pounds. In the case of a moving body, its energy is called *kinetic* energy, while in the case of a body at rest, it is called *potential* energy.

Hence we see that:—

Force is measured in pounds.

Power is measured in foot-pounds per minute.

Energy is measured in $\frac{\text{lb.} \times (\text{ft. per sec.})^2}{2}$

Or energy is measured in foot-pounds.

And now we see how *very* far these three terms are from being synonyms.

The old phrase, "What is gained in power is lost in speed," should be, "The loss in speed is proportional to the gain in mechanical advantage," or "What is gained in force is lost in speed."

That the Gearing of Bicycles depends solely on the numbers of Teeth on the two chain-wheels

The gearing depends solely on the *diameters* of the chain-wheels, and the average speeds of the two wheels are inversely proportional to their diameters. We have to say "*average* speeds," because with chain gearing the velocity ratio of the two wheels is not quite constant, owing to the effect of the length of the links. This, however, is a very small quantity, and for a full explanation of it the reader is referred to page 422 of "Bicycles and Tricycles," by A. Sharp, B.Sc., Wh.Sc. We regret that it is there stated that "the average speeds of two shafts connected by chain gearing are inversely proportional to the *numbers of teeth* on the chain-wheels," for clearly, the teeth are only conveniences to prevent the chain slipping on the wheels, and it is worse than useless to chip off one or two teeth from the hub chain-wheel in order to increase (or from the crank chain-wheel to decrease) the gearing of a bicycle. The writer is informed that this has been actually done!

Of course, as the distance between any two teeth (*i.e.* the "pitch") on the crank chain-wheel is usually the same as that on the hub chain-wheel, the numbers of teeth on the

wheels are proportional to their diameters, but there is nothing to prevent a manufacturer making the pitch of the teeth on the crank chain-wheel some integral multiple (say, of two or three) of the pitch of the teeth on the hub chain-wheel, and this would certainly not alter the velocity ratio; even the effect of the length of the links would be unaltered.

That in Rotary Lawn Sprinklers the Rotation is due to the jets of water "blowing against the air"

The principle of these sprinklers is the same as that of the historical "Barker's Mill," or—to go still further back—"Hero's Engine."

If the popular statement were true, then the sprinkler could not rotate in a vacuum, for it would then have no air to blow against, but we shall show that it would rotate still faster in a vacuum.

For simplicity, suppose one of the sprinklers with straight, horizontal radial arms or pipes, which, of course, are closed at their outer ends, and have a number of small holes, throughout their length, on *one* side only of each pipe, and on corresponding sides of the various pipes. Further, suppose that instead of the pipes being circular in cross-section, they are square, with the side containing the holes in a vertical plane. Now, think of one of these pipes, before the little holes were bored in it, with a water pressure of, say, thirty pounds per square inch above atmospheric pressure in it; it will have no tendency to rotate, for the water is pressing equally on its two vertical sides, and thus in opposite directions. Now bore a number of small holes in one side of it, and suppose that the total area of these holes amounts to one-tenth of a square inch, then the water has one-tenth square inch less surface to press against on this side of the pipe; therefore, the total pressure on this side of the pipe is less than that on the other. Hence the pipe tends to rotate towards the side with no holes in it, and if there are a number of such pipes arranged so that they are free to rotate, then they *do* rotate. The resistance to this rotation is due to the friction of the air, and to the friction of mechanism, which occurs where the rotating portion rubs on the fixed standard. By putting the apparatus in a vacuum we do away with the air resistance,

and hence the sprinkler moves faster. Again, in a vacuum the difference between the pressures inside and ouside the pipe would be (in the case we have assumed) nearly forty-five pounds per square inch, and the force urging the sprinkler to rotate would be greater than before.

That if the form of wheel-teeth be correctly designed the relative motion of the teeth is one of pure rolling

This is rather technical, and we are in fear and trembling lest Mrs. Grundy should hear us "talking shop"! However, as even an engineer may deign to read these notes, we have plucked up courage and decided to throw this fallacy concerning wheel-teeth in his teeth.

The geometrical demonstration that this *is* a fallacy is rather long and requires a figure, but those who are interested in the matter will find it clearly explained on page 447 of "Bicycles and Tricycles," by A. Sharp, B.Sc., Wh.Sc. The probable origin of the fallacy is also given by Mr. Sharp, viz. that it is from the use of the term "rolling circle," in connection with the construction of cycloidal wheel-teeth.

That Sea-water never Freezes.

The large oceans without the Arotic and Antarctic circles do not freeze because the whole of their surfaces are not subjected to a sufficiently low temperature at the same time. One portion might freeze were it cut off from the rest, but not being cut off, and in spite of water being a very bad conductor of heat, the warm ocean currents mingle with it and prevent it freezing. Also, specific heat of water being high, it takes a long time to change its temperature, but at the Poles, of course, the sea-water freezes.

Owing to the salts contained in sea-water, it does not freeze till the temperature has fallen to about 28° F., *i.e.* 4° lower than the freezing point of fresh water. Now if we take a glass jar full of fresh water and gradually cool it, the volume will continue to decrease slightly until a temperature of 39.2° F. is reached; but if the temperature be still further lowered, the volume will slightly increase again, and continue to do so till it solidifies. The effect of this is that, as the water at the top surface in our jar gets cold it sinks to the bottom, until the temperature of all the water is 39.2° F., then the layer at the top will get

still colder, expand, and therefore be less dense than the rest, and hence it will remain on top and finally freeze. But if we fill a jar with sea-water and cool it, this will continue to contract in volume even after 39.2° F. is reached, and it will start freezing at the *bottom* first when the temperature has fallen to 28° F. In freezing, however, the salts are left in solution,* and if the ice crystals be collected and melted, the resulting water will be fresh, except for a certain amount of salt which adheres to the ice and gets mechanically imprisoned in it. As the ice crystals form at the bottom of the jar-full of sea-water they will rise to the surface, because the density of ice is less than that of fresh water, and still less than that of sea-water.

That Common Salt is much more Soluble in Hot Water than in Cold

Most salts are much more soluble in hot water than in cold, and this is especially the case with potassium nitrate (saltpetre). Twelve parts of this salt dissolve in 100 parts of ice-cold water (0° C.), but at 60° C. 110 parts of the salt dissolve in 100 of water. On the other hand, at 0° C. 36 parts of common salt are dissolved by 100 parts of water, and when the water is boiling (100° C.) only two parts more, that is, 38, are dissolved. This is very nicely represented graphically on page 131 of "Inorganic Chemistry," by G. S. Newth, F.I.C., F.C.S.

In the case of calcium hydrate (slaked lime) the solubility at 212° F. is only half what it is at, say, 50° F., and at the latter temperature the solubility is only one part in 900 parts.

That, when swimming or floating, deep water buoys one up more than shallow water

This idea probably arises from the mental effects produced in the two cases. When swimming in shallow water (say, four feet deep), we know that on the least fatigue, or for any trivial cause, we can cease swimming and stand on the bottom; but when we are in deep water (anything over ten feet) we know we *must* keep up, and that we

* If we continue to lower the temperature, the brine will increase in strength owing to the freezing out of the fresh water. This will go on until the brine has reached the strength of a definite compound of salt and water. Then a change occurs, and the ice formed will no longer be fresh, but of the same composition as the brine.

cannot give in for some trivial matter, and hence we exert ourselves more, swim better, and feel better.

From the physical point of view, of course, the volume of water which our body displaces in either case is the same, and as it is also of the same density, therefore the buoyancy is the same, the total force tending to keep us up being equal to the weight of the water displaced, and this is equal to the weight of our body.

A cubic foot of fresh water at ordinary temperatures weighs 62.4 pounds; therefore, a man weighing 150 pounds displaces $\frac{150}{62.4}$ = 2.4 c. ft. of water. A cubic foot of sea-water weighs 64.0 pounds; therefore, a man weighing 150 pounds displaces $\frac{150.}{64.}$ = 2.34 c. ft. of it, that is, less than he does in fresh water; hence a larger portion of his body is above the water in the case of sea-water than in the case of fresh water.

That the Blue Sky does not exist when it is a very dull day

The blueness of the sky is supposed to be due to the minute particles of dust that are suspended in the atmosphere, and it is not space itself which is blue. Clouds prevent us seeing through a sufficiently thick stratum of air which is necessary to give rise to the blue effect, and besides this they intercept the light. If, however, we go up in a balloon, or up a high mountain, so as to leave the clouds below us, then we see the blue sky over head again.

Suppose we continue upwards by some means or other, let us say by means of Jules Verne's gigantic hollow bullet, then, looking upwards, the blue colour of the sky would become fainter and fainter as the layer of atmosphere got thinner and thinner, but we should also find that the light itself diminished until, when we reached the limit of the atmosphere (say eighty miles), there would be total darkness.

Prof. John Tyndall, F.R.S., did a good deal of work to show that the colour of the atmosphere is due to dust.

If the air *per se* had any colour, then we should expect to find liquid air of a still deeper blue than the sky. But liquid air has but a very faint colour, and that is a greenish straw colour.

That turning the hands backwards of a non-striking Watch or Clock damages it

The wheels immediately in connection with the hands of a simple watch or clock are connected to the rest of the train of wheels only by friction, and this being so, it does not do the least harm to turn the hands backwards or forwards. It must be clear that when the hands are turned forwards (or backwards) the whole train of wheels is not affected, for the escapement could not work at that great speed.

When we set the hands of a keyless watch, while we are putting the hands on, it merely increases the amplitude of the swing of the balance-wheel a little, and while we are putting the hands back, we decrease this swing. There are also many striking-clocks that it would not harm to turn backwards, though this process would probably make the hour struck differ from that indicated by the hands.

That a Dam supports the weight of all the Water it impounds, and that consequently if the quantity of water be doubled the strength of the Dam must be necessarily doubled also

Two elementary but fundamental hydrostatic principles are here involved :—

(1) Fluid pressure acts equally in all directions.

(2) Fluid pressure varies directly as the depth of the fluid.

Suppose for simplicity that the water- or up-stream-face of the dam is vertical, and that the ends of the dam finish vertically also, against rock or masonry, the condition of the dam would be then very similar to the gate of a tidal dock at low tide. Due to the conditions supposed there would be, of course, a very considerable pressure of water on the dam. Now imagine that a very large plate of iron is lowered (while held in a vertical position) into the water, being kept a foot away from the up-stream face of the dam. Furthermore, suppose the plate is so large and is just of the right shape to enable water-tight joints to be made between it and the bottom and sides of reservoir. Let these joints be made water-tight. Then, of course, the water is at the same level on each side of the iron plate, which is, consequently, not supporting any water pressure. Or rather the total water pressure on each side of it is equal. This iron plate has obviously not reduced the pressure on the

dam, and thus it will be seen that the wall of water, equal in depth and width to the dam and only one foot thick, produces the same pressure on the dam as the whole reservoir full of water does. Within very wide limits, it does not matter how close the iron plate be placed to the dam. If it is only one inch away, and the water level is the same each side of it, then the pressure on the dam will be unaltered, though, of course, the *volume* of water would be, in this case, only one-twelfth of what it was before. We may, in fact, imagine two dams built close together, with the water between them, and that on the up-stream face of the upper dam at the same level. Then there will be no resultant pressure on the upper dam, while the down-stream dam will support the full pressure. But if the reservoir be emptied while the water between the dams remains at the same level, then the pressure on the lower dam will remain the same as before, and the pressure on the upper dam will be equal to that on the lower one, only in the opposite direction.

The same principle is involved in the imaginary problem of floating a man-of-war by means of a gallon of water. This could be done if a dock were built to exactly fit the outside of the hull of the ship, and if the water were then poured in between the hull and the dock walls.

That a piece of Iron, or other heavy body, will float at a great depth in water

There are two probable causes for this idea. One is a sort of converse of the fact that if a cork, which usually floats on water, be carried down to a great depth in water, then it will not float again, but will sink to the bottom, because at the great depth it gets compressed, all the air is driven out of it, and its density becomes greater than that of water. The other is, it is thought, that because the pressure is so great the density of the water is so much increased that it is even greater than that of iron. Water is, for all practical purposes, incompressible; consequently, its density is not increased by the increase of pressure due to the depth; therefore iron, the density of which is many times greater than that of water, will not float in it even at great depths. While it is true that at great depths the pressure on the under side of a body is very great, it must

not be forgotten that the water also presses greatly on the top of the body, and the one balances or nearly balances the other, so that the tendency to rise or fall remains the same. This explanation should correct the erroneous notions spread by a certain class of writers of fiction, when describing what they think a diver encounters in going into deep water.

That Fog Stops Sound

We agree that when there is a thick "pea-soup" fog in London there is less noise to be heard. This is quite another matter, though doubtless that is how the fallacy has arisen. When such a fog exists in any town, all forms of traffic have to reduce their speed to a walking pace, while all persons who can keep indoors, or even out of the town, on those occasions do so. There is thus a great reduction in the production of noise. Fortunately, we need not satisfy ourselves with this explanation alone, for the late Prof. Tyndall, F.R.S., made an exhaustive set of experiments on this subject, and a full account of these is given in his book on "Sound" (fourth edition, page 284). Those who have not time to read the whole chapter, we would refer to pages 290 and 339. At the end of the latter we have the statement: "A homogeneous air is the usual associate of fog, and hence the acoustic clearness of foggy weather."

That if the Linear Dimensions of a Stone Column (such as Cleopatra's Needle) are Doubled it is necessary to double the Linear Dimensions of the Base for Equal Stability as regards Wind Pressure

This fallacy was originally pointed out by Prof. J. M. Barr, M.I.C.E., in his address to the students delivered at the Inst. Civil Engineers, London, about seven years ago.

A very simple calculation proves the fallacy, but to make the explanation quite clear a diagram is necessary. Suppose, for the sake of argument, we have a stone column ten feet high and two feet square all the way up. Its volume will thus be forty cubic feet, and if the stone weigh 150 pounds per cubic foot, the total weight of the column will be 6,000 pounds. Suppose the wind to blow on to one of the flat sides with an intensity of twenty pounds per square foot, then the total wind pressure will be $10 \times 2 \times 20 = 400$ pounds, and the resultant will act five

feet from the base. The tendency for the column to be blown over will, therefore, be 400 × 5 = 2,000 pound-feet. While the tendency to stability (or moment of stability) is given by the product of the weight of the column into the length of half the base. Thus the moment of stability is 6,000 × 1 = 6,000 pound-feet. The excess of the stability over the upsetting moment is 6,000 — 2,000 = 4,000 pound-feet, or the moment of stability is three times the upsetting moment.

Now suppose the linear dimensions to be doubled, then the column will be twenty feet high and four feet square. Let the stone be cut away at the base, so that the column still stands on a base only two feet square as in the first case. The weight will now be 20 × 16 × 150 = 48,000 pounds, and the total wind pressure 20 × 4 × 20 = 1,600 pounds. The moment of stability will be 48,000 × 1 = 48,000 pound-feet, while the upsetting moment will be 1,600 × 10 (the resultant wind pressure acting half-way up as before) = 16,000 pound-feet. The excess of stability is thus 32,000 pound-feet (eight times as great as before), or it is equal to three times the upsetting moment as before. We hope this is clear. Looked at in general terms, it comes to this: If the linear dimensions are doubled, the weight is multiplied by the cube of two, *i.e.* it is eight times as great while the area of one side is only multiplied by the square of two, *i.e.* by four. But the leverage at which the wind pressure acts is doubled. Hence the upsetting effort is eight times as great, but the product of the weight (eight times as great) into half the base (the same as before) is also eight times as great, and therefore the ratio of one to the other is the same as before, while the absolute stability is positively greater than in the case of the smaller column.

That Increasing the Weight of the Bob of a Pendulum makes the Clock go more slowly

It is a somewhat unexpected fact that the time of oscillation of a simple pendulum depends only on its length, as will be seen from the following expression, which does not include the weight of the bob. By experiment it has been found that

$$t = \pi\sqrt{\frac{l}{g}}$$

Where t is the time in seconds of one swing—

π = 3·1416,

l = the length of the pendulum in feet; and

g = the acceleration due to gravity in feet per second per second.

If the bulk of the bob were very greatly increased, then possibly there might be a very slight reduction in the speed, owing to the increased resistance due to the air, but for all practical purposes, increasing the weight of the bob of a pendulum does not decrease its speed of oscillation.

That Meteoric Iron does not Rust

In 1820 Faraday made some experiments with steel. He alloyed iron with silver, platinum and nickel (separately), hoping to find a non-rusting alloy; and apparently this idea originated with the popular belief that meteoric iron, which is rich in nickel, does not rust. Faraday's experiments proved the contrary, namely, that nickel steel rusts more readily than ordinary steel.

That Water always Freezes when its Temperature is Reduced to 32° F.

The temperature of water can be reduced several degrees below freezing point (32° F.) without it congealing, especially if the water be pure and it is not agitated; but if, when it is at a temperature below 32° F., it is shaken, or if a few particles of matter (or, better still, a few ice-crystals) are thrown into it, then the whole solidifies quickly. The action is somewhat similar to that which occurs when a supersaturated solution of a salt is prepared and a crystal of the same salt is put into it, for then the whole crystallises suddenly. This makes a very pretty experiment to show by means of a magic lantern.

That a Source of Light which emits very few Red Rays may be made Red by enclosing it in a red glass globe

This fallacy has been heard of a good deal lately in connection with the Cooper-Hewitt and other forms of mercury vapour lamps. Several people have asked the author why, if the light is wanting in red rays, the containing tubes are not made of red glass. White light (sunlight) is composed of certain proportions of light of *all* colours, while total darkness is the absence of all colour. Coloured glass

simply acts as a filter or screen of a peculiar kind, letting through all colour of one kind (which we call the colour of the glass) and stopping all the rest. Consequently if there is no colour of a particular hue to let through, the glass cannot let it through, and as it does not let any other colour through, therefore it cuts off all light and causes darkness. Briefly, coloured glass cannot create light of a particular colour.

That Water can be found by a Dowser by the use of a Divining-rod.

As a rule we have not included any fallacy in this book unless we were satisfied, by the evidence before us, that it was a fallacy. In this instance, though we have little doubt about the matter in our own mind, we admit that all the information on the subject which we have studied is very conflicting. We must content ourselves with giving one or two extracts and several references, and leave the reader to pursue the subject further for himself.

As a kind of *hors d'œuvre* we may mention that Dr. Chas. Mackay, on page 251, vol. i., of his "Extraordinary Popular Delusions," gives a list of *fifty-two species of divination*. Fine, high-sounding names they have, too, well calculated to impress the uninitiated. The subject is also dealt with by John Brand in his "Observations on Popular Antiquities," page 760 of the new edition, published in 1900 by Chatto & Windus.

Of course, Sir Thomas Browne, M.D., dealt with the matter in his "Vulgar or Common Errors," published in 1646, and John Timbs, F.S.A., has a page or so devoted to it in his "Popular Errors Explained" (page 168). To our surprise there is nothing in "Choice Notes (on Folk Lore) from Notes and Queries."

Miss A. Goodrich Freer had an article in the *Nineteenth Century* for August, 1897, and in it she says: "The only educated professional waterfinder in England avows that the rod is merely a dramatic accessory. He shares his instinct with most savages, most wild animals, and even many horses."

Prof. C. V. Boys, F.R.S., does not believe in dowsers, as he makes quite clear in a paper to the British Association (Bristol meeting). Mr. W. H. Massey, M.I.C.E., made

some *experiments on dowsers,* in which the latter gave a very poor account of themselves.

On July 30, 1897, the following notice appeared in the *Evening News*:—

"DIVINERS AT A DISCOUNT.

"The Government auditor disallowed the whole cost of the Braslodir experimental waterworks undertaken by the Porthcawl District Council on the advice of professional water diviners.

"The total cost will probably amount to nearly £1,000, the sum in the present account being about £300. A loan of £250, sanctioned by the Local Government Board for the experiment, was allowed, but the whole of the remainder will be surcharged.

"The auditor observed that the expenditure on water diviners' advice was a waste of public money."

The Engineer, of September 24, 1897, had a short paragraph on divination, but undoubtedly the best and most modern reference which we have to give is to the presidential address delivered on November 6, 1900, by the late Mr. James Mansergh, Pres.I.C.E., to the Institution of Civil Engineers, England. Mr. Mansergh was such an eminent waterworks engineer that it is particularly fortunate he has referred to this controversial subject, though he does not appear to have devoted much time to it. It is clear he was not a believer in dowsers, and a large portion of the five pages he gives to the matter are quotations from Professor W. F. Barrett's voluminous paper presented to the Society for Psychical Research. Professor Barrett is Professor of Experimental Physics in the Royal College of Science, Ireland, so that in him we have a scientific and reliable investigator. His original paper of 1897 takes up 282 pages of the Proceedings, and the supplement which he added in 1900 occupied a further 140 pages. Professor Barrett says that nearly 6,000 letters had to be written for the purpose of his first report, which deals with 200 cases of alleged water-finding by dowsers in recent years.

A number of cases where the dowser was successful were found, upon geological observation on the spot, to be capable of explanation by the rapid detection of surface indications of underground water by the dowser, and the

author would particularly draw attention to this explanation, which he considers very important. He believes that, in a similar manner, when people pretend to tell character by reading a person's *hand,* they really base their remarks (possibly unconsciously in some cases) on the general appearance, especially of the face, of their subject, and that if they were compelled to read hands thrust through a hole in a curtain, without ever seeing any more of the person, then they would be hopelessly out in their prognostications, even as they often are under ordinary circumstances. A very strong point in favour of this view that the dowser is very expert in detecting surface indications of underground water is the fact that Mr. Mansergh says he never found a single *blind* dowser in any country of the world during the four centuries the dowsing-rod has been employed.

The curious thing is that the divining-rod, though now used only to find water, was formerly adopted when searching for metalliferous deposits, lost articles, and even criminals. This caused Mr. Mansergh to say that were he to experiment with the forked hazel-twig and find that in a certain spot it pointed downwards, he would not know whether in the eroded cavern below he might expect to find a running stream or a bolting criminal!

That Beech Trees afford Protection from Lightning

In the *Electrical Review* of August 10, 1906, the following paragraph appears:—

"BEECH TREES AND LIGHTNING.

"The popular belief that beech trees are never struck by lightning would seem to be now exploded. Six men were sheltering under a beech tree in the Midlands during last week's severe storm; two were killed, and the others struck down insensible. At the inquest the coroner said he had specially examined the tree, as for years he had read and understood that there was no record of a beech tree being struck by lightning. In this case the lightning had not injured the tree to the extent of damaging a leaf, but it was an accepted fact that six men were sheltering under a beech, and that two of them were killed whilst they stood there. He did not know whether there was any-

thing in it or not, but it appeared to him to be a remarkable circumstance after what he had understood for so long, and he should record the fact that it was a beech tree in the verdict."

On August 3, 1906, the following notice of the same event appeared in the *Daily Mail*:—

"That beech trees do not, contrary to a common belief, afford protection from lightning was shown by the evidence at the inquest yesterday on the bodies of two miners, who were killed by lightning while sheltering under a beech tree."

That putting cold iron bars on barrels of beer prevents the beer being turned sour by thunder

The chief argument against this is that thunder, which is merely a loud noise, cannot *per se* turn anything sour. There may be certain atmospheric conditions, such as the presence of certain substances, which usually accompany lightning and thunder, and which do turn milk and beer sour, but this is due to these accompanying conditions and not to the noise. The iron bars would have a magnetic effect, but they would not alter the constituents of the atmosphere about the beer, and therefore could not affect the latter either for good or evil.

That the angle subtended by the Sun or Moon when they are rising or setting is greater than when they are at their zeniths

For a full account of this fallacy we would refer our readers to pages 82 to 84, inclusive, of "Popular Physics," by Dr. Lardner (rèprinted by Crosby Lockwood about 1894).

Briefly the explanation of why these orbs *appear* to be larger when rising or setting is as follows:—We estimate the size of an object by mentally combining the angle which it subtends at our eye with what we judge to be the distance of the object from us. Now when the Sun or Moon is in the zenith, nothing intervenes between them and us, and we do not think they are far off; but when they are rising or setting, then many miles of trees, houses, fields, mountains, and roads intervene, and we may know intimately a large portion of these intervening objects which appear to stretch away to the end of the earth, and the orb appears quite correctly to be even beyond these.

Hence in this case we are greatly impressed with the distance the Sun or Moon is off, and mentally combining this distance with the same angle subtended at the eye, we arrive at the natural conclusion that the object is much larger. Of course, as a matter of fact the distance is the same in either case, and so is the angle subtended at the eye. This latter fact can be tested by fixing two silk threads on a frame so that when the eye is a certain distance from them they appear to touch two opposite limbs of the orb. Adjusting these to the case when the body is in the zenith we shall find it correct when the same body is setting or rising.

It is a good question to ask someone what, held up at arm's length, *appears* as large as the Moon, that is, what subtends at the eye the same angle. Some will say a cheese, others a dinner plate, and so forth. In reality a sixpenny-piece easily covers either orb.

That the Pressure of the Water at the nozzle of a fire hose is greater than it is in the hose itself, farther back, where the diameter is greater

This, like the fallacy about the pressure of water on a dam, is rather difficult to explain without going into technicalities, for it is really a theorem in hydraulics known as Bernoulli's Theorem, and is another form of the well-known principle of the conservation of energy. In the case of a horizontal pipe, which may vary in diameter throughout its length, the energy of the moving water in it exists in two forms, one in the form of pressure, and the other in the speed with which the water is moving. As the sum of these quantities of energy is constant, it follows that where the pressure is great the speed is small, and where the speed is great the pressure is small. In fact, at the outlet of the nozzle all the energy is kinetic, *i.e.* due to the speed of the water, and the pressure is merely atmospheric. If it were greater than this, then on leaving the nozzle the water would spread out sideways as well as going forwards.

Bernoulli's theorem is experimentally illustrated by having a large pipe of varying diameter from which small glass tubes are carried up vertically from a number of points along its length. On passing water through the large pipe the water rises to different heights in the glass tubes, those connected to the larger sections of the pipe

showing a greater height or pressure than those connected to the smaller sections.

That a Sparrow on a Telegraph Wire ought to get Killed when a Message is Sent through the Line

If this were true in the case of telegraph wires, then it would be even more so in the case of the overhead trolley wires in connection with electric trams, for the electric pressure in the latter is several hundred times greater than in the former, while the current is thousands of times greater. For all this, birds may be seen sitting quite comfortably on trolley wires. Neither human beings nor animals feel the effects of electricity unless there is an electric circuit of which our, or their, bodies form a part, so that the current can " flow " in the manner it is trying to. We may sit on an hydraulic main without the least inconvenience, because the water in it is passing by us. If, however, there is a hole in the pipe and the water comes our way it is a very different tale.

A somewhat analogous case is that of pinching. We cannot experience a pinch unless a portion of one of our arms, say, is subjected to *two* equal and opposite forces. As long as there is only force we do not feel a pinch.

Mr. A. P. Trotter, B.A., M.I.E.E., the chief electrical engineer to the Board of Trade, has done much to show that the danger due to a third or " live " rail, or to the trolley wire of an electric tram, has been much exaggerated. For example, if your boots are dry you may safely stand with one foot on the live rail and the other on one of the bearing or track rails. Similarly when on top of an electric tram on a dry day you may safely touch the trolley wire provided your other hand is not touching any metallic part of the tram. Although this is so we advise the uninitiated *not* to take these risks. The object of mentioning the facts is to allay inordinate fear, especially in the case of an accident.

That all words ending in " ile " or " ine " should be pronounced with the " i " long

This is an error which anyone can easily look up for himself when once it is pointed out. Common examples are fragile, agile, turbine, profile, and projectile, in all of which the " i " should have its short sound.

That ice is never colder than 32° F. or 0° C., the freezing temperature of water

This fallacy may cause you to make a bad bargain, for you might refuse to buy certain ice and accept other at a slightly lower price without going into the question as to which was really the colder ice. Any body or substance may be reduced to the temperature of liquid hydrogen (— 260° C.), which is quite a familiar sight nowadays at the Royal Institution, London, and the lower its temperature the greater its capacity for heat. Hence, *ceteris paribus*, ice, which is at, say, 10° F., is certainly more valuable than when it is only at 30° F. To be exact, if we call the heat-absorbing capacity of one pound of ice at 10° F. 91 thermal units, then the corresponding capacity of one pound of ice at 30° F. is only 81 thermal units. Consequently it often pays to buy natural ice in preference to artificial, as the latter is sometimes only just ice, *i.e.* it is only a couple of degrees below freezing.

That when a Steamship Founders her Boilers Explode

It would be difficult to find a more "popular" fallacy than this one, in spite of the comparative simplicity of the explanation of the error and the fact that it has on several occasions been shown up in the public Press.

The late Sir Frederick Bramwell, F.R.S., M.I.C.E., wrote to the *Times* several years ago and refuted the popular idea. On January 1, 1903, the *Daily Mail*, in a short article, referred to the myth and Sir Frederick's letter to the *Times*, but for all this on November 20, 1905, the following statements appeared in the *Daily Mail*: "The explosion of the S 126's boilers, when the water poured in through the rent made by the ram, was the immediate cause of the heavy loss of life. . . . It is believed that in her case also, with the inrush of the water, the boiler exploded. . . . The general view is that the inrush of water must have exploded the boilers and completed the work of destruction." These three references refer to two separate vessels, one the German destroyer S 126, and the other the Channel steamer *Hilda*. Most of the other morning papers, in dealing with the same two calamities, made similar statements as to the bursting of the boilers.

On April 30, 1906, the Channel steamer *Courier* foundered off Sark, and on May 1 most of the morning

papers again published the fallacy, the *Standard* saying: "Her boiler exploded as she foundered," while the *Daily Mail* put it this way: "To add to the consternation on board, the boiler exploded." . . . "The boiler exploded while the vessel was foundering."

The author on this occasion wrote to a number of morning papers, including the *Daily Mail* and the *Daily Graphic* (one of the few which did *not* propound the fallacy), which on May 2 published the letter as follows:—

"In the notices of the foundering of the steamship *Courier* in several of the daily papers it is stated that 'her boiler exploded as she foundered,' and at least two accounts are so circumstantial as to say that this added to the terrors of the accident! The truth of scientific facts does not rest on the authority of those stating them, otherwise I should not trouble to write to you on this matter, seeing that the late Sir Frederick Bramwell, F.R.S., M.I.C.E., wrote to the *Times* many years ago in an endeavour to end the fallacy. It still flourishes, however. Will those responsible for the statement give a brief explanation as to why a boiler should explode on being immersed in water? As a matter of fact, the immersion of a boiler in cold water cools the water in it, and condenses the steam, so that a vacuum is produced in the boiler, which is consequently more likely to 'inplode' than explode. This fact is easily verified by experiment. Put a little water into a workman's tin flask, boil the water, remove the flask from the fire, and cork it tightly at the same time. Then put it into cold water, and the flask will collapse. The reason for this fallacy is that when a ship founders the sea-water gets to the boiler fires, which are usually numerous and fairly large, and in extinguishing them large volumes of steam are almost instantly produced, because one volume of water forms some 1,600 equal volumes of steam at atmospheric pressure. This escaping steam is mistaken by the non-technical witness to come from the inside of the boiler. Fortunately steam formed as explained is not likely to harm anyone, unless he be in the stokehold or near by. I believe there is not a single case on record in which, on recovering a foundered steamer, her boilers were found to have exploded."

On May 7 the following letter by "Interested" was published by the *Daily Graphic*:—

"I have read with much interest a letter from Mr. Ackermann, A.M.I.C.E., on the subject of the supposed bursting of boilers of steamers on foundering. I have always been very anxious to know why the boilers of a steamer should explode on her foundering, as, of course, the natural tendency would seem to be for the boilers to collapse, owing to the condensation of the steam inside and partial vacuum caused thereby. As you may have noticed, in practically all cases of steamers foundering (unless the engineers have had time to let the steam out of the boilers) some mention is made of the boilers blowing up. I do not think that in so many cases can a mistake have been made, and the escape of steam caused by the cold water rushing into the fires mistaken for a boiler explosion. A well-known naval engineer once gave me a possible explanation of these boiler explosions, which may be of interest to your readers. His theory was that the cold water coming into contact with the boiler-plating caused the outside of it to contract. The inside, being kept warm by the steam, did not contract, with the result that the plate cracked, with the natural result that the boiler burst. Of course, this is pure theory, but still I think that this explanation seems more or less sound."

To the foregoing the author replied thus on May 10:—

"The explanation quoted by 'Interested' in the *Daily Graphic* of the 7th inst. is, I admit, a reasonable one, and would probably be accepted as correct if it were backed up by facts, but, as stated before, I do not know of any case in which, on recovering a foundered steamer, her boilers have been found exploded. Undoubtedly some additional stresses would occur in submerging a boiler shell, but these do not appear to approach the elastic limit of mild steel, even when excessively severe conditions are assumed. There is another argument against the explanation given by 'Interested's' friend. The temperature of the outside of the boiler plates in a furnace is about 700° F. (my friend, Mr. Thrupp, A.M.I.C.E., made some experiments to determine this), and the temperature of the inside of the same plates, due to a steam pressure of 200 lbs. per square inch, is 388° F., and this is about the same difference as between the temperature of the steam (388° F.) and sea-water (say 40° F.). Why, therefore, should the same

difference of temperature in one case be a working condition and in another cause an explosion? Can 'Interested' refer to specific cases where 'the engineers had time to let the steam out of the boilers'? I am interested to know how this was done."

While on May 15 Mr. J. Lester Clark, F.R.G.S., M.I.N.A., late Special Marine Salvage Officer, wrote:—

"DEAR SIR,—I quite agree with Mr. Ackermann's contradiction of the popular idea that a steam vessel's boilers invariably burst when the vessel suddenly founders.

"I have never seen the boilers of a salved sunken steamship showing any signs of ill-effect through the vessel having become suddenly submerged when steam 'was on' the boilers.

"I do not think that any marine salvage expert could narrate a contradictory instance to my above statement.

"This matter has been thrashed out long ago, and I should have thought that by this time the reading public would have been aware of what really does take place, namely, that the clouds of steam which arise on the foundering of a vessel are due (as Mr. Ackermann says) to the flooding of the furnaces.—Yours truly,

"J. LESTER CLARK, F.R.G.S., M.I.N.A."

Mr. J. L. Clark also wrote on May 11 to the author as follows:—

"DEAR SIR,—I beg to hand you herewith a copy of a letter which I addressed to the editor of the *Daily Graphic*. As it may not be published, I think you might like to have the experience of an ex-marine salvage officer in support of your really undeniable reasoning.

"The theoretical arguments you have given in your letters should convince any ordinarily educated person, but there are always those who will argue black is white, and if for the sake of peace you agree with them, they will then start to argue afresh and say they 'meant pink.'—Yours truly,

"J. LESTER CLARK,
"Late Special Salvage Officer to the Salvage Association."

In spite of all this, however, and the fact that the *Daily Mail*, on January 1, 1903, had the little article on "A Boiler-bursting Myth," the fallacy literally ***burst*** forth

again on July 9, 1906, in connection with the loss of the s.s. *Fishren,* at Dover, in giving an account of which the *Daily Mail* of that date said: "She suddenly plunged and disappeared in a cloud of steam, volumes of water being thrown high into the air by the explosion of the boilers"! While on August 7, 1906, the *Daily Telegraph,* in reporting the loss of the s.s. *Sirio,* mentions three times that the "boilers exploded." In conclusion, we will add it is curious that, however many boilers each of these unfortunate vessels had, they all "exploded" exactly together, which, to say the least of it, would be very remarkable if they really did explode.

That Boiling Glass Lamp-chimneys prevents their Cracking

If this were so we may be sure some enterprising firm would have long since thoroughly boiled all their chimneys and advertised the fact, and the public, having found that these particular chimneys never cracked, the firm's name would be as well known now as the Bank of England.

That a Chimney Draws

This fallacy persists on account of such expressions as "the heat is all drawn up the chimney"; "the chimney is dirty; it won't draw," but these arose through a misconception of the physical facts. In spite of this misconception we find the true cause implied in the name of the piece of thin sheet iron used for "drawing" up a fire, it being called a "blower." The warm air in a chimney is lighter than the corresponding quantity of cold air outside the chimney, consequently the latter is not balanced by the former, and it forces its way into the bottom of the chimney, some of it passing through the fire on its way. By the use of a "blower," or newspaper, placed over the opening above the fire, a greater proportion of the air is compelled to go through the fire, so that the latter is really blown up.

That Sugar and Vinegar (or Salt) Neutralise one another

To a certain extent they hide one another in the same way that scent may hide an unpleasant odour. In these cases a mere mixing of the substances takes place, but in order to have neutralisation a chemical action must take place such as the neutralisation of an acid (lemon juice) by an alkali (bicarbonate of soda).

That if you do not throw Salt into the fire before you begin to churn, the Butter will not come

This, according to "Notes and Queries," is a North Lincolnshire fallacy. The absolute disconnection of the two things makes it too preposterous for us to attempt to deal with it. The only reason for mentioning it, and one or two others which equally outrage our early twentieth century reason, is that readers may have samples of literally hundreds of fallacies which we have omitted exhibiting a lamentable lack of even the feeblest reasoning powers on the part of those who believe them. Truly Professor John Perry, F.R.S., had every excuse for writing his admirable book, "England's Neglect of Science." If any should doubt that many of their fellow countrymen and women do believe such monstrous rubbish let them read "Choice Notes" from "Notes and Queries," and question people about these matters, especially those living in the country.

That all Chamois Leather is made from the Hides of Animals of that name

Most of the so-called chamois leather is made from sheepskins, and while most leather is preserved by the use of tannin in some form, "chamois," or wash-leather, is prepared by the use of oil.

That if there is a Leak of Gas it should be looked for with a Naked Light

This stupidity holds sway in at least two continents (though it is perhaps not fair to include the United States on only one case personally known to the author, even when that case concerned a clergyman), for in addition to numbers of cases in Great Britain, the author came across one in Cumberland, West Virginia, while he was there in 1901. There was a leak of gas in a church. The clergyman sought the leak with a naked light and—found it! In this case the searcher was not badly injured, but his church was wrecked, the roof was blown off, and one of the gable ends was blown down, besides other damage.

In another case, in London, in the author's bachelor days, he noticed a smell of gas in his first floor room, and went down to investigate in the room immediately below, when to his horror he found his landlord just entering that room with a lighted candle "to look for the escape of gas"! We *knocked* the candle out and left explanations

to a later period; the windows and door were fully opened to let the gas out, and then it was found the chandelier was short of water. In the course of the deferred explanations we regret to record that the man would not acknowledge the past danger, evidently needing an explosion to convince him, and which (as far as the author is concerned) he is now quite at liberty to have.

My friend, Mr. F. H. Hummel, M.Sc., A.M.I.C.E., believes that people think that they are looking for only a *small* leak, and that so long as there is not a large volume of gas present there is no danger. But almost the reverse is true, for while very weak mixtures (about one volume of gas to sixteen volumes of air) are not explosive, a point is reached (about four volumes of gas to one of air) when the percentage of gas in the mixture is too high for it to explode, while the most explosive mixture under ordinary atmospheric conditions is about equal volumes of each. Thus a small leak will keep the mixture within the danger zone longer than a large one, and in this sense is more dangerous than a larger leak.

We will end this fallacy by a couple of quotations from daily papers:—

"It is Mr. John Pybus this time. He is a builder of West Hartlepool, and there was an escape of gas in his house. He is not dead; but only severely burned. He will not look for the next escape of gas with a lighted candle next time. But some other man will."

The foregoing is a type of anecdote which might always be kept in type for the "Child's Guide to Knowledge," along with this one. "Mr. Blank Blank had a revolver in his hand yesterday. He did not know it was loaded. The funeral will take place to-morrow."—*Globe*, November 14, 1898.

"Explosion, followed by fire, caused by the venerable, if foolish, practice of 'seeking for an escape of gas with a light,' on Saturday wrecked No. 294, Coldharbour Lane. A man named George Clark (aged forty-one) was burnt on the left hand."—*Daily Mail*, June 19, 1899.

"Searching for a leakage of gas with a lighted match in a baker's shop at Taunton yesterday, a man caused a serious explosion, which wrecked the premises and injured himself and another person."—*Daily Mail*, April 8, 1907.

That certain People can "tell the Fortunes" of others by "reading their hands"; in other words, that they can predict the chief events in those persons' lives

This is certainly one of the fallacies which are harmful, if not positively dangerous, and anyone can satisfy himself on this point by reading the evidence of the trials of a few of the leading fortune-tellers who have fortunately placed themselves within reach of the law during the last few years. The chief crusade against them was made by the enterprise of the *Daily Mail,* and we would refer our readers to the files of that and other papers of June, 1904.

There they will find columns of the most damning evidence against this ignorant and stupid survival from the dark ages, enough, in fact, we should think, to satisfy all who are outside the walls of a lunatic asylum. But from the evidence produced in these fortune-telling cases and those dealing with the hoary confidence trick (not to mention Carlyle's statement to the effect that there are forty millions of people in Great Britain, "mostly fools"), it is obvious that our lunacy laws are very lenient, and that consequently shoals of harmless (?) idiots roam the land and support fortune-tellers and other sharpers.

One prosecution worth looking up appeared in the daily papers of Saturday, April 7, 1900, and dealt with a fortune-teller calling herself "Madame Zuleika." She was fined £35, including costs, and the leading article on "Witchcraft Up-to-date" in the *Daily Mail* of that date ends thus:—

"All who have seen below the surface know how too often families are broken up, silly minds are turned, domestic peace destroyed by the mumbled nonsense of these seers. The revelations in a recent divorce case are but typical of what is done a hundred times over."

Ford, in his "Line of Life," says: "Deceiving and deceivable palmsters, who will undertake by the view of the hand to be as expert in foretelling the course of life to come to others as they are ignorant of their own in themselves."

We have failed to find a word in support of palmistry in that classical work, "The Hand," by Sir Charles Bell, F.R.S., being one of the "Bridgewater Treatises."

For a most readable account of swindles and swindlers

see "Memoirs of Extraordinary Popular Delusions," by Chas. Mackay, LL.D.

That Boiling Liquids may be poured into Glass Vessels without cracking them if the Bottom of the Vessel be pressed with the Bowl of a Spoon while the vessel is being filled

If the glass is thin there is no need to trouble about it cracking, because the heat is communicated right through the glass quickly, the whole expands together, and the vessel does not crack; but if the glass is thick, the surface of it in contact with the boiling liquid expands more than that remote from the liquid, and a crack is thus caused. Mere pressure would not prevent this action, and the only ray of reason we can read into this fallacy is that if the vessel is not large, and the spoon be a metal one, then metal being a far better conductor of heat than glass, the boiling liquid will be partly cooled by coming in contact with the cold spoon.

That Egyptian Cigarettes are made of Tobacco grown in Egypt

Mr. C. E. Clark ("The Mistakes We Make") says that since 1890 the cultivation of the tobacco plant in Egypt has been prohibited, that consequently "Egyptian cigarettes" contain no Egyptian tobacco, and that it is for their workmanship and the curing of the leaf that the Cairenes are so justly celebrated. The tobacco they use comes entirely from Turkey.

The author's cousin, Miss Jessie A. Ackermann, F.R.G.S.Scot., says that the Sultan of Turkey put such a large tax on the growing of tobacco in Egypt that it has made it commercially impossible to grow it, and that his object was to keep Egypt as a market for the Turkish tobacco.

FALLACIES CONNECTED WITH STATISTICS AND NUMBERS

FALLACIES CONNECTED WITH STATISTICS AND NUMBERS

That the Square Root of a Fraction is less than the Fraction itself

We usually deal with the square roots of integers, or whole numbers, saying, "The square root of 64 is 8," and so on, in which case the root *is* less than the number; but the square root of $\frac{1}{9}$ is $\frac{1}{3}$, for $\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$, and $\frac{1}{3}$ is *greater* than $\frac{1}{9}$. Or we have in decimal fractions: the square root of 0·25 is 0·5, and 0·5 is *greater* than 0·25.

That there are Three (some say Seven !) Women to every Man in England

This is a most curious fallacy, and one which some of us poor men, who are not particularly handsome or charming, regret is a fallacy! There *are* more women than men in England, as the following table (from "The Statesman's Year Book," 1896) shows:—

	Males.	Females.	Ratio of Females to Males.
England	13,291,402	14,192,088	1·068
Wales	761,499	757,536	0·995
Scotland	1,942,717	2,082,930	1·072
London	1,999,435	2,232,683	1·117

From this we see that London is the most favoured! But, strangely enough, though there are more women than men alive, more males are born than females, the numbers for England in 1894 being 453,016 males and 437,273 females, *i.e.* for every 1,036 males born there are only 1,000 females born. The infant mortality of males is greater than that of females, and then men, owing to their vocations, are more exposed to trying conditions and accidents than women, hence their number is reduced to below that of women.

In 1894 256,015 males died, *i.e.*, 17·6 per 1,000 of living males; but only 242,812 females died, *i.e.* 15·7 per 1,000 of living females.

During the ten years 1884 to 1893, inclusive, out of equal numbers living there were 1,122 deaths of males to 1,000 deaths of females.

These facts have been used to prove the superiority of women by the doctrine of the "survival of the fittest!"

Now that women are entering so many walks in life which in former years were monopolised by men, they are more exposed than they used to be, and hence we may expect the excess of women to be reduced or removed altogether.

Another factor causing the excess of women in England is that the majority of emigrants are males, and consequently in the Colonies (*e.g.* in Australia and the Cape) the men are slightly in excess. Lastly, girls are taking much more exercise now (by going in for cycling, boating, tennis, golf, hockey, etc.); tight-lacing is on the decline, and these factors aid in maintaining an excess of women, but then we cannot have too much of a good thing!

The fallacy may have arisen by someone noticing the proportion of men to women outside Peter Robinson's when there was a sale on!

It is a slight digression, but interesting to note that the average age at which a bachelor marries is 26½, that of a spinster 25, of a widower 44, and of a widow 40½.

That a Warm, or Green, Christmas makes a Fat Churchyard

In refutation of this we cannot do better than quote an article which appeared in the *Standard* on February 16, 1895, and point out that this article also deals with another fallacy, viz. "that death from cold is intensely painful."

We are also reproducing a short article which appeared in *Answers* of March 11, 1899.

"*Standard*, February 16, 1895.

"DEATHS FROM COLD.

"Death has no better ally than a 'good old-fashioned winter,' in spite of ancient saws and sayings to the contrary. As the thermometer falls the death-rate rises, and so it is happening now. The present winter has no claim to historical rank as yet, however keenly we may feel it at the moment, but the frost has lasted three weeks, and its effects are visible in the Registrar-General's Returns and the

records of the Coroner's Court. Up to the commencement of the present spell of cold weather the death-rate had been remarkably low for many months, both in London and the country generally. According to a Return just published, the rate for the last quarter of 1894 was the lowest ever recorded for that period of the year, being only 16·4 per 1,000, whereas the average for the previous ten years was 19·0 per 1,000. London fully shared the general healthiness, until the colder and rougher days of January set in. After a period of fluctuating and unsettled weather, continuous frost began about the 25th of last month, and since then the death-rate has steadily risen from 17·6 in the first week to 19·0 in the second, and 21·0 in the third. Considering the severity of the cold, it is surprising that the rise has been no greater. During the last notable frost, which occurred in the winter of 1890-91, the Metropolitan death-rate ran up suddenly to 26·0, and then to 29·7, while in more northerly towns it repeatedly exceeded 40·0, and even 50·0, per 1,000. The explanation lies, probably, in the character of the present frost, which has, so far, been accompanied by an extraordinary amount of dry and fine weather since the first snowfalls. This, indeed, has been its most striking feature. Usually, a severe English winter brings with it a leaden sky or dense fogs. So it was in 1890-91, the daily record reading either 'overcast' or 'foggy,' with hardly any exception.

"But this year we have, until quite lately, enjoyed cloudless skies for days together. The difference may be measured by the fact that last week alone the number of hours of bright sunshine was more than double that recorded during seven weeks of frost in 1890-91. It is not cold alone that kills, but cold accompanied by darkness and damp, and especially the icy gloom of our terrible frosty fogs. In the year 1880 a prolonged spell of such weather brought the London death-rate up to 46·7 in the first week of February. We have so far been wonderfully lucky this winter in getting off with two or three partially foggy days, and the immunity is cheaply purchased at the cost of the cutting east wind. After all, our severest cold is a mere trifle compared with the ordinary winter temperature which occurs in many countries, and is easily borne, not merely because people are accustomed to it, but because it is

accompanied by a dry atmosphere and bright sunshine. These help to counteract the physiological effect of cold in 'lowering the vitality,' whereas darkness and damp increase it. Nevertheless, such weather as we have recently had inevitably claims a large number of victims among the old, the very young, and the infirm of all ages. The chief cause is the aggravation of those affections of the chest which are at all times so great a scourge in these islands. The deaths attributed last week to this cause in London alone numbered 480, of which 40 per cent. occurred in persons over sixty years of age, and 30 per cent. in children under five.

"A different and more immediately striking aspect of the subject is revealed by the painful disclosures of the coroners' courts. Day by day for the last fortnight accounts have come from all parts of the country telling of persons found 'frozen to death,' and the inquests held on such cases in the East-end alone have been numbered by scores. Some of these unfortunate victims have succumbed out of doors, but many have died quietly under shelter, while at their work, or even in bed. One woman, 51 years of age, was discovered leaning over her sewing-machine quite dead; another, aged 74, complained bitterly of the cold, lay down on a sofa before the fire, and was found dead the next morning; in the third case, a man, aged 53, after complaining of the cold, fell dead on the floor. There can be little doubt that in these, and a great many other similar cases, death occurs from the failure of an already weak heart. The first effect of cold is to irritate the nerves, and when it is severe this irritation is accompanied by pain. Next, the circulation is affected, the arteries contract, tension increases, and the heart beats less rapidly. Then the breathing also becomes slower. These effects are purely physiological, and occur normally in the inhabitants of cold countries and in hybernating animals. Thus the pulse of the Greenlander is scarcely one-half so rapid as that of the Englishman, and in winter the marmot's breathing sinks from 30 to seven or eight per minute, its pulse from 90 to eight or nine. Unless reaction occurs, the effects deepen. The circulation proceeds more and more slowly, and finally stops altogether in the extremities. This is the stage of frost-bite, which occurs without the least consciousness on the part of the sufferer. Later on, other tissues participate

in the moribund process. Deprived of their proper blood-supply, the muscles become affected; they quiver and grow stiff. The nerves also cease to perform their functions: numbness and partial paralysis ensue. Finally the brain is attacked, an intense drowsiness or light delirium commonly occurs, and is soon followed by death. The heart stops beating either because it is paralysed, or because it is unequal to forcing the blood through the contracted arteries. This is the ordinary process of death from cold, and it is easy to see how it may be accelerated by weakness of any kind, whether due to lack of food or physical exhaustion, or existing disease. But there seem to be other cases which are not so readily explained. For instance, a woman was found lying insensible at six o'clock in the morning in one of the recesses on London Bridge. Before she could be taken to Guy's Hospital life was extinct. It turned out that she was a respectable charwoman, of temperate habits, and earning a good living. She had left home in her usual health at half-past five to go to work, and had 18s. 6d. in silver in her pocket. There was no sign of disease or starvation, and death was consequently attributed to 'shock' from the cold.

"The vulgar notion in regard to dying from cold is, that it is one of intense suffering, but, happily, there are good reasons for thinking that this is a mistake. The most painful stage is the first, when vitality is still strong and capable of resistance. We are all familiar with it, as a matter of common experience. When the process is prolonged so as to become dangerous to life, it is accompanied by a progressive insensibility. The vital powers are stolen gradually away, and with them the capacity to feel pain. It is notorious that frost-bite, which is a localised death, commonly takes place without the victim's knowledge, and a curious proof occurred a few days ago among a shipwrecked crew, cast ashore in a desolate spot on the Scotch coast. They managed to light a fire and huddled round it, when one of the party noticed that the second engineer's foot was burning. Two toes were found to have been burnt completely off without any consciousness on the man's part, so complete was the insensibility in the frost-bitten limb. Indeed, those who succumb most readily to cold probably feel it less than others, for feeling implies life. And this,

perhaps, explains why we never hear of the victims of cold in this country being afflicted by the agonising thirst often described by Arctic explorers as affecting strong men in their mortal struggle with the enemy. The weak die without struggling, and therefore comparatively without pain. They pass away under the influence of cold in what is, after all, a not unmerciful form of death."

The article from *Answers* of March 11, 1899, is as follows:—

"ANOTHER PROVERB GONE WRONG.

"The very old proverb, 'A green Yuletide makes a fat churchyard,' is probably believed in by nine out of every ten persons. But the returns of the Registrar-General show that, as in the case of so many proverbs, there is not a word of truth in it.

"The true facts of the matter are, that the temperature of winter has little effect on the death-rate, while the temperature of summer has a very great effect indeed. Sometimes mild winters are very unhealthy, sometimes they are quite the opposite. The winters of 1877, 1884, and last year, for instance, were extraordinarily mild, and also exceptionally healthy. But many other mild winters have not been so.

"On the other hand, 1891 was the coldest but one this century, and it had only an average death-rate. Very cold winters were experienced in 1881 and 1894 also, and both were particularly healthy. But in other cold winters the death-rate has been abnormally high.

"But, with regard to summer, hot seasons are always unhealthy, and cold seasons are healthy. The years 1868, 1878, and 1887 were very hot, and the death-rate was extremely high. The summers of 1862, 1879, and 1888 were notorious for cold, and they have been the healthiest summers for half a century. A very hot summer is as bad as a war for the country, as 40,000 more Britons die than in an ordinary summer.

"Broadly speaking, the direct opposite of the popular belief is true. You hear people complain of unseasonable weather as if it were a bad thing, but it is really the best kind of weather. That is to say, the colder the summer and the warmer the winter, the fewer will be the cases of sickness and death."

That Exceptions prove the Rule

Most people who use this sentence do not realise the meaning of the word "prove" as it is here used, and consequently they use the phrase to imply that the validity of some rule or other is strengthened rather than weakened by the existence of an exception. This is ridiculous. The phrase is a literal, but somewhat incorrect, translation of the old grammarian's dictum, "*Exceptio probat regulam.*" "*Probat*" may be rendered "proves" in the old sense of "tests," but not in the more modern sense of "demonstrates." The real meaning is "Exceptions test the rule," that is to say, if the exceptions are found to be too strong or too numerous, the rule breaks down and ceases to be a rule at all.

That the World was only 4,000 Years Old when the Christian Era began

This idea is, of course, taken from the Bible, where, opposite the first verse of the first chapter of Genesis, we see the date "B.C. 4004." This and the other dates in the Old Testament were arrived at by Archbishop Ussher ("*Annales Veteris et Novi Testamenti*," and "*Chronologia Sacra*," 1650), and they were first added to the English Bible by Bishop Lloyd in the great edition of 1701.

We extract the following from "Helps to the Study of the Bible" (Oxford Press, 1895):—

"The years are found by taking the age of each person in the genealogy at the birth of his eldest son.

"The opinions of chronologers as to the era of Creation vary, indeed, by many centuries: Ussher (in 1650), 4004 B.C.; Hales (in 1830), 5411; Jewish reckoning, 3760; Alexandrian, 5503, etc."

That we shall ever know the exact age of the world is highly improbable, but it is quite certain it is more than 6,000 years old at the present time. Lord Kelvin estimates it at about 26 *millions* of years, and this is one of the lowest of modern estimates!

That January 1, 1900, was the First Day of the Twentieth Century

History repeats itself. About the year 1800 people used to be puzzled to know whether such and such a day or month belonged to the eighteenth or nineteenth century, and now if it be asked whether January 1, 1900, was

in the nineteenth century or the twentieth, most people will reply wrongly, and it is somewhat difficult to show them where the mistake comes in.

The first century began with January 1, 1, that is, we write the number of the year before we have had the whole year; thus we wrote January 1, 1896, before we had had even two days of the 1896th year. On December 31, 99, there had been 99 years of the first century, and the *whole* of the year 100, from January 1, 100, to December 31, 100, must be added to complete the first century. Similarly, on December 31, 1899, we had had 99 years of the nineteenth century, and we had to have one whole year more to complete the nineteenth century, *i.e.* January 1, 1900, to December 31, 1900, belonged to the nineteenth century, and January 1, 1901, was the first day of the twentieth century.

In proof of the confusion there is on so simple a matter (due to a want of an elementary scientific knowledge) we quote the following :—

From the *Pall Mall Gazette* of July 27, 1898 :—

"AN OLD, OLD CONTROVERSY.

"DEAR SIR,—In your issue of the 21st, under 'Glasgow Exhibition in 1901,' it is 'to be held in the first year of the next century—namely, in 1901,' the article states. Is this correct? That is, that the first year of the next century is 1901. Why not 1900? The first hour of our day is from 12 to 1 a.m. The matter of 'what is the first day of the twentieth century' has been much discussed, and as we are within measurable distance of it now, it might be a matter of interest to have the point settled before the day arrives. It is hardly to be supposed there is anyone now living who can give us the acknowledged first day of the nineteenth century.

"If you can see your way to bring this point before your readers it might be of interest to many.—I am yours, etc. "C. H. C."

From the *Daily Mail* of January 2, 1899 :—

"WHAT CENTURY IS THIS?"

"The Great Question of the Hour—Is This the Twentieth Century?

"'When does the twentieth century begin?' That is the question of the hour. Many intelligent people believe

that it will begin one minute after the last hour of the present year of grace. Others are as firmly convinced that the twentieth century will not dawn till the bells have rung out 1900 and rung in 1901. It requires some courage to make pronouncement one way or the other, for, judging by the communications which have reached this office, a fierce controversy is raging on the subject. But there is no gainsaying facts.

"This world had to exist 100 years before it completed its first century. It commenced counting the years with the first day, and one minute after midnight on December 31, 100, the second century began. So it is only natural to conclude that immediately Big Ben has boomed out twelve on the night of December 31, 1900, the world will have been projected into the twentieth century.

"Hear what Mr. Dyson, Assistant Royal Astronomer, said to a *Daily Mail* representative at the Royal Observatory yesterday:—

"'The question as to when the twentieth century begins is not, in the true sense, an astronomical one. It is not determined by the position of the planets or anything of that kind, but is merely a question of usage. It depends upon what constituted the first year of the present era.

"'Undoubtedly they began by calling the first year the year 1, even though it was not a month old. If they did so then, of course it required a complete hundred years to finish the first cycle. The second century, therefore, dated from January 1, 101.

"'The succeeding centuries following the same order, the twentieth century would have its beginning on January 1, 1901. I noticed one of the London papers the other morning contained an exhaustive editorial commencing with the words, "On this the last day of the last year but one of the nineteenth century." This is not the way we reckon it; though, as I have said, it is not a question that astronomers are greatly concerned with.

"'We do not deal with centuries, but with years, and our observations and data would be recorded in the year 1900 or 1901, as the case might be. Undoubtedly it would have been more convenient for matters of calculation had the ancients begun with the year 0, and thus the cycles would have all begun in figures ending in 0.

"'There is another question as to the time of day the new century begins. All astronomical days begin at noon. Calendar days begin at midnight, so that usage again decides that the twentieth century will begin as soon as the clocks have struck twelve on the night of December 31, 1900.'"

From the *University Correspondent* of December 30, 1899:—

"A lot of childish and apparently useless controversy has been waged during the last few months on the subject of the birthday, or rather 'birth-year,' of the new century. Writers, many of whom we imagined would have known better, have persisted in maintaining that our connection with the present century is severed at midnight on December 31 of 1899. We hear that the German Emperor is of this opinion, and that he has 'ordered' the new century to begin a year before its time. From this time forward Germany will, in reality, be twelve months ahead of the rest of the civilised world. The Pope, more tolerant, if not more enlightened, arranges a compromise by which both parties shall be satisfied, and decrees that the new century shall have two beginnings, a preliminary *début* at the end of the year 1899, and a second birth at the end of the year 1900.

"In this way we sincerely hope that our short-sighted contemporaries, who must begin the new century at the moment when they date their letters 1900 instead of 1899, will be satisfied. All this controversy would have been avoided had the Christian era begun with the year 0 instead of the year 1. We do not consider a person twenty years old till they have completed twenty years of life, whereas the beginning of the year 1900 marks the completion of only 1899 years, and another year is required to complete the nineteenth century."

That Four Feet Square and Four Square Feet are the same Quantity

This sounds rather like the difference between Tweedledum and Tweedledee!

A table-top which is four feet square measures four feet along each edge, and its area is *sixteen* square feet; but a table-top of four square feet measures only two feet

along each edge, and is only one-fourth the area of the first table.

This is somewhat akin to the question, "What is the difference between six dozen dozen and half a dozen dozen?" Think it out!

That Statistics can prove Anything.

A more popular catch-phrase than this among those who are unaccustomed to dealing with figures it would be difficult to find. There are few arguments in which it is not necessary to bring forward statistics of some sort, but directly this is done these unsatisfactory people quote the above statement with an air of infallibility and finality that is perfectly marvellous.

Of course, we assume that the figures *are* statistics, that is, a collection of *facts*, and that they are not "cooked," "fudged," or in any other way the product of some unscrupulous individual. This being so, it is absolutely ridiculous to suppose that by submitting these figures to any mathematical process we can alter the *facts*, though we may be able to state the facts in figures in such a way as to be misleading, especially to those not conversant with statistics.

As a very simple illustration, suppose that in some very little village there are only four children, and that two of these have measles. We can quite truly say that 50 per cent. of the children in such-and-such a village are down with measles, but the statement would be misleading to anyone who did not know the number of children in the village. On the other hand, suppose another very small village with five children, and that all of these have scarlet fever; this fact would then not *appear* so serious to one who was told that five children had scarlet fever, and who did not know the total number of children in that village, and who consequently would not realise that all the children who could take scarlet fever had done so.

Again, some years ago there was an increase in the number of cases of cancer, and at the same time there happened to be a fine crop of tomatoes, which were eaten.*

* There was nothing to show that the cancer patients had eaten more than their share of the tomatoes; and, even if they had, the case against tomatoes would by no means have been proved.

Then some illogical individual stated that the eating of tomatoes produced cancer, and gave figures to "prove it," as he said. Now, how *could* the figures *prove* what was not a fact? Clearly, if anyone allows himself to be misled in that way, it is only his own short-sightedness and ignorance that he has to blame, and *not* the statistics—*facts*, which cannot lie.

Is it likely that men of such standing as many of the members of the Royal Statistical Society are would give their time and money to dealing with statistics if they could be made to prove anything?

We *must* have statistics—of the birth-rate, marriage-rate, death-rate, cases of various diseases, accidents, water-supply, milk-supply, bread-supply, production of iron, steel, and other metals, the numbers of men (and women) employed in different professions and trades, the number of passengers per train-mile and per track-mile, etc.; imports, exports, things made in Germany, etc.—and most useful they are, and very interesting they can be made, as the perusal of the articles on the last census in the *Strand Magazine*, and in the *Daily Graphic* of September 2 and 4, 1893, will prove.

From the *Globe* of September 13, 1901, we copy the following article:—

"THE ENGLISH RACE.

"*It is a common sneer of the ignorant and unthinking that figures may be made to prove anything, and that statistics are consequently useless and misleading. Sir Robert Giffen, in his presidential address to the Economic Science Section of the British Association yesterday, effectually proved the falsity of the taunt.* He took as his subject 'The utility of common statistics,' and handled it in his customary lucid and interesting manner. It is a subject on which he is peculiarly well qualified to speak, as there is no Englishman living who knows better how to turn ordinary statistics to account and to reach their true significance. Naturally, the recent census returns afforded him ample matter for discussion. The first fact to which he drew attention was the remarkable growth during the century just past of European peoples and peoples of European origin, and particularly the increase of the English people and of the United States. The total increase is from 170

millions to 510 millions, viz. 340 millions, 22·5 per cent. of which is due to the English-speaking races. This result assures the preponderance of European peoples among the races of the world, 'putting completely aside the nightmares of yellow or black perils arising from the supposed overwhelming masses of yellow or black races,' these races being practically stationary.

"Next to the English-speaking peoples, Russia and Germany have increased more rapidly than any other countries, the growth being from 40 to 135 millions in the case of Russia, and from 20 to 55 millions in the case of Germany. The expansion of population is an admirable guide to the relative political and economic importance of civilised States. A hundred years ago France stood supreme in the consideration of statesmen, while important parts were played by Austria, Italy, Spain, and Holland. These have, during the nineteenth century, been the countries of stagnation so far as population is concerned, and to-day we see their places taken in the councils of the world by Britain, the United States, Russia, and Germany. In comparing Britain with Germany, Sir Robert was able to give much consolation in these alarmist days. Germany, he showed, is almost as dependent as Britain upon importation for food supplies and the necessaries of its commercial life, and increasingly so. Russia is rapidly gaining in reliance on the outside world; the United States alone is, and will, for a long time to come, be self-supporting. The disadvantage of our isolated position is thus largely neutralised, and a blockade is a thing to be feared almost as much by our great rivals as by ourselves. Another bogey which this able statistician was able to rob of its terrors was the dread of over-population. The feverish anxiety of these latter days to find new markets for the new population is, he showed, quite unreasonable. New population automatically finds an outlet for its industry and a source of support, in the increased demand that it itself creates, independently of mere agriculture. Hence the rapid growth of towns and great centres of industrial activity as compared with the slow increase or decline in country districts. As the population grows so it becomes more and more self-supporting, paradoxical as such a statement may at first sight appear.

"That the rate of increase of population in the English-

speaking races is slowly declining appears to be certain. But the decline is not one at which we need be alarmed. It is a very small diminution in the case of the British Empire, and both in our own nation and in the U.S.A. it is a perfectly natural reaction from the abnormal rate caused by the peopling of vast new countries in the early days of the century. Even if this decline should become much more marked and rapid, so that the percentage of increase per decennial period should fall from its present approximate 16 per cent. all round to 10 per cent.—a most unlikely contingency—the increase in European races during the present century would be from 500 millions to 1,500 millions, the growth being, of course, in compound ratio. These general statistics dealing with the whole of any race independent of its distribution, that is, apart from any individual country, are free from the misleading results of migration, and it is this factor, change of *locale* of large sections of the population, that Sir Robert showed very largely accounted for the apparent decline during recent years in the 'natural increase' of population, viz. the increase due to excess of births over deaths, in the British Empire, a matter that caused no small amount of uneasiness when the census return was first published. As a matter of fact, the same apparent decline has occurred in the States. It is due to many causes; first, the misleading results shown in newly populated countries at the beginning of the century, when an exceptionally large proportion of the inhabitants were at the child-bearing age—making the birth-rate abnormally high—and very few old people were present, making the death-rate exceptionally low. Then this same emigration from the old country had exactly the reverse effect on the figures for the Motherland in the latter portion of the century—the proportion of child-bearers was reduced, and the ratio of senile and decaying persons was increased. Many other facts, all tending in the same direction, have to be taken into consideration in dealing with this question, and the unhesitating conclusion at which Sir Robert arrived was that there was no serious diminution in the reproductive power of the British nation, such as has been witnessed with such lamentable results in France. We are, in fact, for all practical purposes, as virile a nation to-day as we were a hundred years ago, pessimists notwithstanding."

That most Deaths occur between the Hours of Two and Six in the Morning

Dr. Charles Féré some years ago tabulated the death hours of all patients dying in two Parisian hospitals during a period of ten years, and he found that there were rather fewer deaths between seven and eleven o'clock in the evening than at any other time, but that *there was no special preponderance at any hour.*

This experience agrees with that of the medical man referred to in the following article, which appeared in *Pearson's Weekly* of August 8, 1896:—

"WHEN THE MOST DEATHS OCCUR.

"A very general opinion is entertained by medical practitioners and others engaged in caring for the sick that the greater number of deaths occurring in individuals afflicted with disease takes place during the hours immediately succeeding midnight and preceding the dawn. The rule is said to be particularly true in those suffering in chronic exhausting diseases, and deductions have been made from these impressions which have served to regulate the administration of stimulants in such cases, it being said, 'if six ounces of brandy be needed in twenty-four hours, four should be administered from two to six a.m., for then is vitality in the human being at its lowest,' and 'more deaths occur at these hours than at any other period.'

"'I accepted this teaching at college,' says a medical man, 'because I had neither the means nor the time to verify or disprove it to my own satisfaction. Yet I always doubted the correctness of the conclusions drawn, and, to settle the doubt in my mind, since entering on my duties at the hospital I have collected statistics, which I find do not agree with this generally accepted idea. The figures show twenty-seven fewer cases during the hours from six p.m. to six a.m. than for corresponding twelve hours of the day. Again, from two to six p.m. there were sixty-six more deaths than from two to six a.m. The total number of deaths in the list of acute diseases for the twelve hours from six p.m. to six a.m. is 169 less than for the corresponding period during the day.

"'The hours from two to six a.m. in this list show fifty-three cases more than for the corresponding period in the afternoon. This in nearly 4,000 cases is very slight.

In the chronic cases the greatest number of deaths at any one hour was at four p.m., with two and five p.m. and six a.m. closely following. The greatest in the acute list was at three a.m., with eleven a.m. and p.m. closely following.

"'The lowest number in the acute list was at twelve midnight, that hour so dreaded in the sick-room by attendants, and to which a good deal of superstition attaches. It is noticeable that the number for this hour is exceedingly low—about half of the average number. In the chronic cases the lowest number appears at nine a.m.

"'From these 15,000 cases, extending over a period of twelve years, it would appear that death occurs seemingly without any particular predilection for any certain hour, and that the number of deaths for each hour is very evenly proportioned, considering the large number of cases taken and the time covered.'"

That if you toss a Coin, say, Ten Times, and each Time it comes "Heads," then the next Toss is more likely to result in a "Tail"

This fallacy—known as the "resolution of the odds"—probably arises from an incorrect combining of one chance with another. We know that under certain given conditions we can quite correctly calculate the chance of a certain event happening. Suppose that on doing so the chance is one in nineteen. By this is meant that if we repeat the conditions an indefinite number of times, then *on the average* the particular event will occur once in every nineteen cases. This is quite a different thing from expecting that it *must* occur once if we repeat the conditions nineteen times, but thinking this (as is common) we naturally expect, as we get towards the end of the set of nineteen, that each succeeding experiment is more likely than the last to give the particular case. In the case of a coin it is bound each time to fall either a head or a tail. Therefore *each throw* the chance of it falling a head is one in two, no matter how often it has come a tail before.

For much that is interesting on this subject, see "Choice and Chance," by Benjamin Allan Whitworth, M.A.

FALLACIES CONNECTED WITH THE WEATHER

FALLACIES CONNECTED WITH THE WEATHER

As we are reprinting in full the Presidential Address on Weather Fallacies of Mr. Richard Inwards, to the Royal Meteorological Society in 1895, besides some other matter, we are giving all the Weather Fallacies together, and for still further information on the subject the reader is referred to "Weather Lore, a Collection of Proverbs, Sayings, and Rules concerning the Weather," compiled and arranged by Richard Inwards, F.R.A.S., F.R.M.S. (1893).

WEATHER FALLACIES

(The references are to the pages of this book where the fallacy is dealt with.)

That when the Moon is said to be "on her back" tempests and commotions will come. [p. 251.]

That the Winter is going to be very Severe when the Holly or Hawthorn Berries are Prolific, or when Wild Birds are Tame. [pp. 257 and 268.]

That the Moon affects the Weather. [p. 252.]

That there are Gales during the Equinoxes. [pp. 265 and 266.]

That a Green Christmas makes a Frosty Easter. [p. 269.]

That when the New Moon occurs on a Saturday there must follow Bad Weather. [p. 253.]

That the Full Moon clears away the Clouds. [p. 252.]

That you should only sow Beans, prune Vines, or cut down Trees in the Wane of the Moon. [p. 253.]

That Two Full Moons in a Month will cause a Flood. [p. 253.]

[Think of the many people who see two moons several nights in a month; but this is usually *caused* by a flood of liquor.]

That November is the Foggiest Month of the Year. [p. 270.]

That to see the Old Moon in the Arms of the New brings on Rain. [p. 253.]

That if it rain on St. Swithin's Day it will rain for Forty Days after. [pp. 250 and 265.]

Weather Fallacies.

[An address delivered to the Royal Meteorological Society by Mr. Richard Inwards, President. (Reprinted from the *Quarterly Journal* of the Society, by kind permission of Mr. Inwards and the Secretary.)]*

"In the long and patient pursuit which the attainment of all accurate knowledge exacts from man, it may sometimes be instructive to turn one's gaze backward and contemplate the errors which have been corrected, the fallacies which have been demolished, and the superstitions which have been lived down; and this consideration has prompted me to take for the subject of this year's address that wide range of human opinion which may fitly be classed under the head of 'Weather Fallacies.'

"Nothing could have been more in accordance with the law of growth in other branches of knowledge than that Meteorology should, in its earliest dawn, have been with difficulty able to emerge from the mists and darkness of guesses and surmises such as have surrounded the transfer of any truth from the barbaric to the philosophic stage.

"It is to the Greeks that we must look for the first real weather observations after the matter had passed through what may be called the mere savage phase; and we find Hesiod, Theophrastus, and Aratus presenting us with an early code of rules, which serve at least to show us how little we have ourselves advanced in some matters since their time.

"One of our Fellows, Mr. J. C. Wood, has just given to the world an excellent and scholarly translation of the work of Theophrastus, which has not previously been put in an English garb, and Mr. Wood has done the whole country a great service in giving us this translation of the 'Winds and Weather Signs,' a book which contains a host of rules and observations about the weather, and which, as might have been expected from the production of the favourite pupil of Plato and Aristotle, is singularly free from errors of the grosser and more superstitious kind, such as were plentifully produced in Western Europe many centuries later.

"But long before the time of Theophrastus, and probably very soon after the invention of agriculture itself,

* This address also appeared in *Nature* of August 15, 1895.

there were weather gods and weather fallacies; for we find that Jupiter Tonans and Pluvius—the thunderer and the rain-maker—were set by men on the highest pedestals. And, centuries after this, Lucian tells us that it was usual in his time to offer prayers for suitable weather, and he recounts in his 'Dialogues' how two countrymen were at the same time offering up contrary petitions—one that not a drop of rain might fall until he had completed his harvest, while the other prayed for immediate rain, in order to bring on his backward crop of cabbages—both suppliants only too sure to find that the ears of the image were deaf as the stone of which they were made, and that the wheels of the universe would not wander or turn back for any selfish ends of man.

"In considering these early times, when the weather had to be studied from cloud, sky and sea, and from the behaviour of the animals and plants, we must be ready to excuse men for doing that which is still too frequently a cause of error, viz. foretelling what they most wished for, and putting down as universal law that which was only a coincidence of totally independent events. In considering weather fallacies it will be impossible to follow a chronological order, so I shall treat them, or rather a small portion of them, under the heads of saints'-day fallacies, sun and moon fallacies, and those concerning animals and plants; while, finally, I shall consider the almanack makers, weather prophets and impostors who have from time to time furnished the world with materials for its credulity or its ridicule.

"The first class of weather fallacies, which I shall scarcely more than mention, are those which refer to the supposed connection between the weather of any day in the week or year and that of any other period, and it may be as well to state at the outset that there is no kind of foundation in fact for any of these so-called rules. They are for the most part born of the wish to see certain kinds of weather at certain times of year, and, like all these predictions, were faithfully remembered when they came true, and promptly forgotten when they failed. One has often heard—

'Fine on Friday, fine on Sunday,'

or that 'Friday is the best and worst day of the week,'

and the superstition even extends to hours of the day, for we have—

'Rain at seven, fine at eleven,'

which is only another way of saying that rain does not usually last four hours, and the rule generally fails when applied to daily experience; but the host of proverbs connected with saints' days are more difficult to deal with, on account of the longer time which elapses between the prophecy and its fulfilment or failure. All or most of these proverbs concern the days of certain saints, though I think no one imagines that this is anything more than a convenient method of fixing the date, because our ancestors had a saint for every day, so that they naturally referred to the day by his name.

St. Swithin's Day.

"There are forty weather saints, among the most prominent of whom is undoubtedly St. Swithin, whose day is July 15, and the superstition is that if it should rain on that day it will rain for forty days after. Now, as Mr. Scott observes, this date is very near a well-known bad time in wet years, as the terms, long in use, of 'St. Margaret's flood' and 'Lammas flood' abundantly testify. The fact that some of these heavy rains began on July 15 has been enough material for the adage-monger, and so we have another 'universal' law laid down, a law which is, however, constantly broken, as every student of the weather very well knows. The whole thing is a fallacy of the most vulgar kind, and ought speedily to be forgotten, together with all the adages which make the weather of any period depend on that of a distant day.

"Turning in weariness from this class of superstitions, which may be said to belong to the self-exploding order, we are next met by an extensive array of authorities who, under the protecting shield of astronomy, profess to have framed infallible rules for the weather as judged from the ever-varying relative positions of the sun, moon, and planets. They attack us systematically and persistently, appealing to analogy, to reason, and to common sense. But it is sometimes necessary to be on our guard, even against common sense, in considering problems to which uncommon sense has for centuries been devoted without avail.

Action of Sun and Moon.

The well-known action of the sun and moon upon the ocean tides is generally the starting point of these theorists,

and it is soon shown to common sense that when the earth is nearer the sun, or the moon is nearer to the earth (it being remembered that they move in elliptic orbits), or when both sun and moon are, as it were, pulling together, as at new moon, there ought to be a tide of atmosphere caused by their influence similar to the tides of the ocean, which such agencies undoubtedly produce. But we find that, whatever so-called reason, analogy, and common sense may seem to dictate, the facts will not follow in the path marked out for them; and the atmospheric tides refuse to ebb and flow, except in a most infinitesimal degree. quite disproportioned to their supposed moving forces. The theorists must try again, and they do so by pointing out that the moon and earth move in planes which are inclined to each other at an angle, and that at some times of the year the attraction of the sun and moon are acting in somewhat widely diverging lines, whilst at others they are pulling more nearly in the same plane. Here is, they say, a clear case. At times, when the angle is greatest, there should at any rate be worse weather caused by the conflicting forces. When the moon is said to be 'on her back,' or, in other words, when the line of the shadow boundary of the half-moon or crescent is much inclined to the earth's axis, then is the time, say they, for tempests and commotions to come. But again the spirits from the 'vasty deep' do *not* come when called, and we have to invent other causes for our earthly disturbances.

"It may be safely said that a new moon theory as to the weather comes out at least once a year, and it has been attempted to connect the honoured name of Sir William Herschel with a table which professed to show the dependence of weather changes on those of the moon.

"By the kindness of Mr. Symons I am able to show you on the screen a much magnified representation of this production, now very scarce, and which has the name of Herschel in large capitals, no doubt as a sort of ballast to give it weight and steadiness, though it does not definitely state that Herschel had anything to do with it. Herschel's own letter on the subject runs as follows:—

"'SIR,—I am glad of an opportunity to say that prognostications of the weather are so much *above the knowledge* of astronomers that I have taken uncommon pains publicly

to contradict reports of predictions that have been ascribed to me. You may, therefore, be assured that what you have heard as my opinion about the frost is without the smallest foundation. If at any time Slough should be in your road, I shall be very glad to see you here, and remain, Sir, your most obedient Servant,

"'WM. HERSCHEL.

"'Slough, near Windsor,
February 6, 1814.'

So that any Fellow of this Society who sees one of these diagrams in the future will know that it is a fraud.

Change of Weather with Change of Moon.

"Of course it is in the power of everyone to check the predictions which are so often issued with respect to the changes of the weather taking place at the change of the moon; but many eminent men have occupied themselves with the subject, and the result is that no correspondence between the two classes of phenomena has been established.

"Dr. Horsley examined the weather tables of 1774, as published by the Royal Society, and out of forty-six changes of weather in that year only ten occurred on the days of lunar influence, only two of them being at the new moon, and none at all at the full. M. Flarguergues, of Viviers, found also, as the result of twenty years' observations, that the barometer readings taken when the moon was farthest from the earth averaged 755 millimetres, and when nearest, 754 millimetres, showing a difference of one millimetre or about ·04 inch, and this in a direction against the theory, the pressure being greater by that amount when the moon was farthest from the earth.

"Various other weather seers have pinned their faith on lunar cycles, and have predicted that weather changes would repeat themselves as soon as the sun and moon got back into the same relative positions, which they do in nineteen years, with only an error of an hour and a half. Others, such as Mr. G. Mackenzie, advocated a cycle of fifty-four years, but it may be summarily stated that all the cycles have broken down, and that, as far as we know, there is no definite period after which the weather changes repeat themselves.

"Other fallacies about the moon are numerous, such as that the full moon clears away the clouds; that you should

only sow beans or cut down trees in the wane of the moon; that it is a bad sign if she changes on a Saturday or Sunday; that two full moons in a month will cause a flood; that to see the old moon in the arms of the new brings on rain; and many others, of which a catalogue alone would take up a good deal of space. M. Flammarion says that 'the moon's influence on the weather is negligible. The heat reaching us from the moon would only affect our temperature by twelve-millionths of a degree; and the atmospheric tides caused by the moon would only affect the barometric pressure a few hundredths of an inch —a quantity far less than the changes which are always taking place from other causes.' On the whole we are disposed to agree with the rhyme which thus sums up the subject:

"'The moon and the weather
May change together;
But change of the moon
Does not change the weather.'

"Even the halo round the moon has been discredited, for Mr. Lowe found that it was as often followed by fine weather as by rain, and Messrs. Marriott and Abercromby found that the lunar halo immediately preceded rain in thirty-four cases out of sixty-one. We always have a lingering hope that some future meteorologist will disentangle the overlapping influences, and arrive some day at a definite proof that our satellite after all has something to do with our weather.

"About the sun, also, there are many fallacies, and ever since the discovery that the spots which appear on his surface have a period of greatest and less frequency, there have been theorists in shoals who have sought to prove that this fact rules our weather. It has undoubtedly been found that the frequency of sun-spots and the variations of the magnetic needle are intimately connected; and it is almost equally well established that the aurora appears and disappears in some sort of sympathy with the sun-spot variations. But this, up to the present, is as far as we can get in this direction, for our weather seems to have no definite relation to these changes.

"The more recent discoveries of prominences visible round the disc of the sun during an eclipse, and of the

light clouds only seen in M. Deslandres' spectro-photographs, will no doubt call out new weather theories on the subject. And I must confess to a wish that those mysterious flame-like bodies rushing from the sun millions of miles into space, will be found to have some influence on the upper layers of our earth's atmosphere; but I also hope that we may be saved from a theory on the subject until more facts are before us.

Animals and Weather Changes.

"Coming down to earth again, we are met by a long array of fallacies connected with the behaviour of animals and plants, and which have a supposed connection with weather changes. Few of these are so well grounded that they may be considered as proved, and as nothing is sacred to a meteorologist, our veteran Fellow, Mr. E. J. Lowe, F.R.S., has endeavoured to put some of the rules from this source to the test of definite observation. He took a number of well-known signs said to indicate change, and carefully noted what happened after each sign, and although he does not say that all indications from animals, birds and plants are useless, yet certainly those he did investigate seemed utterly to break down.

"He took the well-known signs of bats flying about in the evening, many toads appearing at sunset, many snails about, fish rising much in lake, bees busy, many locusts, cattle restless, landrails clamorous, flies and gnats troublesome, many insects, crows congregating and clamorous, spider-webs thickly woven on the grass, spiders hanging on their webs in the evening, and ducks and geese making more than usual noise. Mr. Lowe found that in 361 observations of the above signs, they were followed 213 times by fine, and only 148 times by wet weather; so that even after the prognostications for rain, there was a greater preponderance of fine weather. He called a day fine when no rain was measurable in the rain-gauge. Mr. Lowe says that even swallows flying low cannot be depended on, as, especially at the close of summer and autumn, they almost invariably skim the surface of the ground; and Mr. Charles Waterton, the naturalist, decided, after careful observation, that the unusual clamour of rooks forms no trustworthy sign of rain. These must, therefore, swell the list of fallacies, although there are many other rules which have not been so carefully examined, but which

may still be true. My own impression is that although it is painful to dismiss the animals from their ancient position as weather prophets, we may consider them as indicating what they feel, rather than as predicting what is to come, and that their actions before rain simply rise from the dampness, darkness or chilliness preceding wet weather, and which render these creatures uneasy, but not more so than they affect man himself. The sheep turning its back to the wind (one of the best known signs of rain) is probably only that it may shelter its least protected part from the effects of the weather; and many of you must have observed sheep sheltering their heads from the heat by getting them into the shade of each other's bodies in a similar way.

"As to cows scratching their ears, and goats uttering cries, and many other signs of bad weather, they are at least very doubtful; whilst the adage about the pig which credits him with seeing the wind, carries with it its own condemnation.

"The medicinal leech is still left on the list of weather prophets, though he has no doubt had his powers exaggerated; and two books have been written about his behaviour during changes of weather. One is by Mrs. Woollams, who, during a long illness, watched a leech in a bottle, and carefully noted what it did; and the other is by a gentleman at Whitby, who came to the conclusion that the leeches could be made to give audible and useful storm warnings. So he contrived the instrument, of which I now show you a drawing taken from his book. No one would imagine from its appearance what its use could be. It consisted of twelve glass bottles each containing a leech in water, and so arranged in a circle, in order, as the humane inventor states, that the leeches may see each other and not endure the affliction of quite solitary confinement—this rather reminds us of Isaac Walton, who told his pupil to put the hook into the worm 'tenderly, as if he loved it'—in each bottle was a metal tube of a particular form, and which was made somewhat difficult for a leech to enter, but into which it would endeavour somehow to creep before a thunderstorm, according to its nature. In each tube was a small piece of whalebone, to which a gilt chain was attached, and so arranged, on the mouse-trap principle,

that when the whalebone was moved the bell at the top of the apparatus was rung by means of the chain. There were twelve leeches, so that every chance was given that one at least would sound a storm signal. The author called this apparatus the 'Tempest Prognosticator,' a name which he preferred—and I think we shall agree with him—to that of atmospheric electric telegraph conducted by animal instinct. He went on to state in his little book that he could, if required, make a small leech ring the great bell of St. Paul in London as a signal of an approaching storm. The book is written in all seriousness, and a number of letters are appended from gentlemen who certify that correct atmospheric indications were at various times given by the leeches. The name of the inventor of this ingenious contrivance was Dr. Merryweather—himself a learned leech.

Plants and Weather Changes.

"Plants have also their advocates as weather indicators; and there is no doubt that in most cases they act in sympathy with changes in the dampness, gloominess, or chilliness of the air, and as these conditions generally precede rain, one cannot term the indications altogether fallacious. The pimpernel and the marigold close their petals before rain, because the air is getting damper, while the poplar and maple show the under surface of their leaves for a similar reason. Indeed, an artificial leaf of paper may be made to do the same thing, if constructed on the same principle as the natural one—a hard thin paper to represent the upper side of the leaf, and a thicker unsized paper for the lower side; these will, if stuck together, curl up or bend down in sympathy with the hygroscopic condition of the air. A slip of ordinary photographic paper will do the same, and will curl up at once when placed on the hand.

"The same slackness which moisture produces in plants applies in some degree also to insects, some of which can only fly in sunshine, so that there is a chain of weather signs all following from a little dampness in the air. The flowers close their petals and shut in their honey, the insects cannot fly so high, and the swallows seeking them skim the surface of the earth, and even then the threatened shower may not come.

"In 1892 attention was directed to a plant, the *Abrus*

precatorius, a beautiful shrub of the mimosa kind, which has the property of being sensitive in a high degree, so that its pinnate leaflets go through many curious movements, and it was claimed that these form a guide of unerring certainty to foreshow the coming weather. Even earthquakes were said to be predicted by this wonderful plant. If it closed its leaflets upward, after the manner of a butterfly about to settle, fair weather was shown; when the leaflets remained flat, changeable and gloomy weather was indicated; while thunder at various distances was to be foretold by the curling of the leaflets, and the nearer the thunder the greater the curl, until, when the points of the leaflets crossed, the thunderstorm was indicated as being overhead. Changes of wind, hurricanes, and other phenomena were to be shown by the various curious and beautiful movements of the leaflets and stalks. These movements undoubtedly took place, but when the plant was submitted to the unprejudiced observation of Dr. F. W. Oliver and Mr. F. E. Weiss, at Kew Gardens, those gentlemen failed to find any connection between these movements and the weather, and Dr. Oliver made a report on the matter, which hits the heart of the whole subject of plant movements, by ascribing them for the most part to the agency of light and moisture. Mr. Scott, of the Meteorological Office, gave the finishing stroke to the theory by proving that the movements had no connection with either cyclones or with earthquakes, so that the sensitive plant may be considered as out of the list of weather guides, in spite of having been made the subject of an English patent.

Holly-berries and Severe Winter.

"It is a most common observation in the country that a large crop of hips, haws, and holly-berries indicates a severe winter to follow, and it is generally pointed out that nature thus provides winter food for the birds. This, too, is a fallacy.

The Form of Lightning Flashes.

"Another weather fallacy, for which artists are responsible, is that flashes of lightning take the form of long angular lines of a zig-zag shape,* and of which I show you an example, taken from a work on the subject. This, when compared with the next view, which is a photograph taken direct from nature, shows that the artist had very little

* See also p. 51.

understood the true form of the lightning flash, which consists of numbers of short curves joining each other, something like the course of a river depicted on a map, or in some degree like the outline of a clump of leafy trees seen against the sky. But, as far as I know, there were only two artists whose acute vision saw lightning in anything like its true form. One was Turner, who, long before the time of photography, scratched his lightning flashes with a penknife, making short curved dashes across the picture; and the other was Nasmyth, the astronomer and engineer, who also saw the lightning in its true form, and duly noted the same, only to be confirmed years afterwards, when it became easy to photograph the lightning flash itself. While on the subject of lightning, I may mention that it is recorded that in one case at least a rheumatic man, who had been confined to bed six weeks, received a shock from a stroke of lightning, jumped from his bed, and ran downstairs completely cured. This is related in the *Gentleman's Magazine* for June, 1820.

Rain-making by Detonation.

"It has been often stated that the noise of cannon will produce rain, and it is not unusual in the Austrian Tyrol to hear the church bells ringing to avert thunder. These are fallacies. The experiments in America made recently, to test whether rain could be produced by exploding a large quantity of gunpowder in the air, resulted in nothing except noise and smoke, though the thing was well worth trying.

"Empedocles of old is credited with the invention for chasing away the Etesian winds by placing bottles made of the skins of asses on the hills to receive them. Timæus relates this. After hearing this about Empedocles, one is not surprised to learn that he thought there were two suns, that the moon was shaped like a dish, and that the sea was the sweat of the earth burnt by the sun. All this will be found in Stanley's 'Lives of the Philosophers.'

"Almost in our own time, too, a 'pluvifuge,' or machine for blowing away rain, was proposed in Paris. This, too, was a fallacy.

"To give an account of all the various ceremonies in savage and civilised countries which have been resorted to for the purpose of changing the course of the weather, would be here impossible; but such rites have a common origin and a common result. They begin in error, and end

in failure. In India, the rain-god is imagined to pour down showers through a sieve; in Peru there was supposed to be a celestial princess who held a vase of rain, and, when her brother struck the pitcher, men heard the shocks in thunder. In Polynesia rain comes from the angry stars stoning the sun; while in Burmah it is still the custom to haul down rain by pulling at a rope. New Caledonia has its regular rain-making class of priests, and in Moffatt's time the rain-makers of South Africa were held in even higher estimation than the kings; and on the other side of the world the Alaskan propitiates the spirit of the storm by leaving tobacco for him in a cave. In our own country, too, there have been weather witches of various grades, and one described in Drayton's 'Moon Calf'—

> "'Could sell winds to any one that would
> Buy them for money, forcing them to hold
> What time she listed, tie them in a thread
> Which, ever as the seafarer undid,
> They rose or scantled as his sails would drive
> To the same port whereat he would arrive.'

The Finlanders at one time drove a profitable trade by the sale of winds. *After* being paid, they knitted three magical knots, and told the buyer that when he untied the first he would have a good gale; when the second, a strong wind; and when the third, a severe tempest.* Sir Walter Scott also mentions that King Eric, also called 'Windy Cap,' could change the direction of the wind by merely turning his cap round upon his head; and old Scotch women are mentioned who, for a consideration, would bring the wind from any desired quarter.† The Mandan Indian rain-maker had a rattle by the noise of which he called down rain from heaven by the simple process of keeping on long enough. It is safe to say that these are all fallacies.

Weather Almanacks.

"From the rain-makers we may now turn for a moment to the almanack makers, and anyone who will look up an old almanack of the early part of the last century will find the greater part of it filled with lucubrations on the influence of the stars and constellations; he will also find a column giving for every day the parts of the body which are particularly under the celestial influences on the given dates: and when one sees for the first time this column

* Olaus Magnus, "Hist. of the Goths," 1638.
† Notes to "The Pirate."

reading—head, chest, legs, knees, feet, etc., one wonders what it can mean; but it was then so well understood as not even to require explanation, and there was generally too a rude woodcut of a hideous human figure, tattooed with the various signs of the zodiac to show the same thing. The sort of knowledge that passed for meteorology in 1703 may be learned from the following extract from 'Meteorologiæ,' by Mr. Cock, Philomathemat. 1703—a rare book in the possession of Mr. Symons:—

"'The twelve signs are divided into four sorts, for some be earthy, others watery, a third sort aery, and the fourth sort is fiery.' The author then goes on to state that 'Jupiter in the Skinker (whatever that may be) opposed by Saturn in the Lion did raise mighty South-west winds. . . . Observe when a planet is in an earthy sign he was lately dried up by perambulating a fiery sign, and after that, immediately having made his progress in an earthy sign, is quite bound up from moisture.'

"It seems incredible that our ancestors, only a few generations back, could have bought, paid for, and believed, such stuff as this. The early almanacks boldly gave a prediction for the weather for every day in the year, but after a time confined themselves to a general statement of the weather; for instance, 'Partridge's Almanack' for 1835 has the following prophecy for June: 'Fertilising showers attended with thunder and lightning'—this does for the first ten days. 'Fair and at times hot' for the middle of the month, and 'refreshing rain for the grass and corn' for any time between the 21st and the end of the month.

"Authors of weather almanacks had already begun to seek safety in vagueness. Some of these almanacks rose to a great popularity on the strength of one lucky guess; and I think it is told of this same 'Partridge's Almanack,' or some other of the class, that it owed its reputation to a curious prophecy of extraordinary weather for July 31, when hail, rain, snow, thunder, etc., were freely indicated. Forgetting that the month had 31 days the almanack maker had omitted to insert the weather prediction for the last day, and a boy was sent from the printing office to know how the space was to be filled up. The weather prophet was too busy to attend to him, but at last, in a passion, said: 'Put down hail, rain, snow, thunder, any-

thing' ; and the boy taking it literally told the compositor, who duly set into type the extraordinary prediction, and which by a freak of nature came true, and made the fame and fortune of the almanack maker. This story, if not true, is at least *ben trovato*, and shows the force of the bard's statement—

"'Our indiscretion sometimes serves us well
When our deep plots do pall.'

"The 'British Almanack' for 1831, published by the Useful Knowledge Society, had no weather predictions.

"Patrick Murphy published a popular weather almanack, and his fame is said to have commenced by a lucky hit in one of the earlier issues by which he indicated which would be the coldest day of the year. There is a copy of this almanack for 1838 in the library of the Society, and some former owner has evidently taken the trouble to pencil in the actual weather opposite to that predicted. There were, according to this annotation, 89 incorrect forecasts, 91 doubtful, and the rest correct.

"This Patrick Murphy was not a mere charlatan. He had a system, and though he differed from Sir Isaac Newton and the Royal Astronomical Society, he gave much study and research to the subject of meteorology—as shown by his various books. There was an Astro-Meteorological Society as late as 1861, and we have some numbers of its 'Records' in our library.

Weather Prophets.

"Next comes the subject of weather prophets as distinguished from mere almanack makers; and who profess, sometimes for pelf, at other times for honour and glory, to predict the weather for any future date. These are always arising, and they do not lack a certain number of followers, who, possessing a large angle of credence, duly trumpet forth the successes of their chiefs, when they are so fortunate as to make any. The stock-in-trade of a prophet is of a slender and cheap description. He must have an inventive mind, a store of self-confidence, an insensibility to ridicule, and, above all, a keen memory for his successes and a prompt forgetfulness of his failures. He should by choice have a theory, and this should be of the elastic order, so that if a predicted event does not punctually occur, he will be ready with a sort of codicil to amend it. Hence we find that the firing of guns has been cited as a sufficient reason

for falsifying a weather prediction; and railways, too, are said to have an adverse influence, one author (not a prophet) telling us that they may be considered as 'large winnowing machines, perpetually fanning and agitating the air with prodigious power, ploughing the air, as it were, and causing waves of vast extent, which, invisibly enlarging like the waves of the ocean, probably meet each other, clash, and produce modified effects, as resultants from adverse motions.'

"One of the first weather prophets mentioned in that delightful old book, Stanley's 'Lives of the Philosophers,' was Democritus the Milesian, known as the 'laughing philosopher,' who foresaw a dearth of olives, and by buying up all he could get might have made a fortune, but gave it back to the bargainers with the remark, 'You can see now that a philosopher can get rich when he pleases.' Then there was Pherecydes, of whom Pythagoras was a favourite pupil, who predicted an earthquake three days in advance by the taste of the water from a certain well. Perhaps the earliest of all was Elijah, who from the top of Carmel pointed out the coming squall cloud, and predicted a great rain. He forms a good model for imitation to the modern weather prophets, for he did not prophesy until he saw the storm coming, and he made no secret of his method. We have still amongst us in our country, mostly without honour, seers who supply us with weather predictions in various forms, from the modest duodecimo almanack to the flaring broadsheet which compels attention; but it would be a task too long to enter on a systematic refutation of their contradictory guesses at the weather. The last of these broadsheets that caught my eye had for the days of the gale of December, 1894, which Mr. C. Harding has described to us, the tame announcement of 'generally overcast.' This did not err on the side of boldness when considered with reference to one of the severest gales of the century.

"A Spanish peasant whom I heard of in Andalusia, and who had the reputation of a weather prophet, wisely said, if you want to know the weather for to-morrow, ask me early in the morning. The Indian weather prophets who made a failure had to be silent altogether for the rest of their lives; and this causes us to regret that some of our own seers were not born in that distant land.

"As to the so-called weather forecasts, they only come under the title of this paper when they fail, and as eight out of ten are said to be correct, I shall only say that they are honest attempts on the part of civilised governments to warn their people as far as possible against the march of known disturbances. I could wish that the term 'weather indications' or 'indicated weather' had been adopted, so as to make this plain to all, and that oftener, when the signs were vague, we had the simple announcement of no change indicated.

"The director of this system so well known to us, and who is playfully called the 'Clerk of the Weather,' sometimes receives valuable hints, even from children; and I must quote one such communication.

"'Please, Mr. Clerk of the Weather, tell the rain, snow, and hail to stop for the afternoon, and rain in the night.'

"I may conclude this section by saying that it is a great fallacy to suppose that there is such a thing as a weather prophet. All the great authorities agree that in the present state of our knowledge no human being can correctly predict the weather, even for a week to come.

People who *Think* they can Control the Weather.

"And now we must consider a class of weather fallacies of which the victims can only excite in a well-regulated mind feelings of sadness and compassion, rather than the ridicule to which at first sight they seem more naturally entitled. I mean those weather prophets in whom the delicate mechanism of the mind is touched by disorder or decay, even if it has not already fallen under the stroke of complete dementia, and who believe that they can not only foresee the weather, but, by an effort of their own minds, control the elements and compel the clouds.

"These patients I had hoped only existed in small numbers; but, on perusing the correspondence of a prominent meteorologist, kindly lent me for the purpose, I find that there are many of this class whose name, like that of the ancient wanderer among the tombs, is 'Legion,' and who still come on, each prepared to drive the chariot of the sun, or by an exertion of his own will, odylize (the word I suppose will come) all the powers of nature.

"Dr. Johnson's Astronomer says in 'Rasselas': 'Hear me, therefore, with attention. I have diligently considered the position of the earth and sun, and formed innumerable

schemes, in which I changed their situations. I have sometimes turned aside the axis of the earth, and sometimes varied the ecliptic of the sun, but I have found it impossible to make a disposition by which the world may be advantaged. What one region gains another loses. Never rob other countries of rain to pour it on thine own.'

"This type of patient, as well as those who would use their supposed power for the purpose of creating fine weather during the holidays of the people, belong to the more noble sort, but there have been others, like the notorious Friar Bungay, who for sordid reasons have professed to exert a similar power. The only wonder is that anybody ever believed them.

"Now, as this malady of the mind is not incurable, I will venture to offer a practical suggestion, and would recommend these patients who have nursed themselves into the belief that they possess the keys of the weather, to seek the hill-top on a summer afternoon—the air and exercise will do them good—and watch the fine fleeces of cumulus cloud as they sail majestically across the sky, each with its attendant shadow below. Let the patient concentrate his attention upon one single feathery cloud, and try by the exertion of his utmost force of will to make it pause for a moment in its career; and, if he fails—'as fail full well he may'—then let him banish from his mind for ever the idea that he can by his own will dominate the whole firmament. And if he has ever gone into print upon the subject, let him go home, and, like Prospero, his prototype, say—

"'Deeper than ever plummet sounded,
I'll drown my book,'

and so save the world from the trouble of investigating much pure nonsense. To these sufferers I can only repeat the words of one of our own kings to the last man he touched for the evil, 'I wish you better health and more sense.'

The Sun's Action on a Fire.

"I must be forgiven for having only made a selection from the vast catalogue of fallacies which have accumulated about the subject, and I must continue to regret that there are still people who are ready to believe that the saints' days rule the weather, that the sun puts out the fire,* that warm water freezes sooner than cold, or that a man is a prophet because he says so himself.

* See also p. 5.

"This Society is clearing the ground of many weeds, and already the fallacy of the 'equinoctial' gales has been exploded (by Mr. Scott),* while the churchyard ghost of the supposed fatal 'green Christmas' has been most effectually laid by a recent statistical paper by Mr. Dines. Equinoctial Gales. Green Christmas and Fat Churchyard.

"Someone may ask, after all this clearing away of fallacies: What have we left? and I would venture to refer him to all the patient work which is being done in various countries, and by which a real Science of Meteorology is being slowly built up, while to the outdoor weather student I would offer this consoling reflection: There is still the sky."

That if it Rain on St. Swithin's Day (July 15th) it will also do so on the following Forty Days

The French have two similar proverbs:—

"*S'il pleut le jour de St. Médara* (June 8), *il pleut quarante jours plus tard*"; and "*S'il pleut le jour de St. Gervais* (June 19), *il pleut quarante jours après.*"

On page 22 (the Calendar) of the *Teachers' Prayer Book* (1882) we have the following: "July 15. *Swithun, Bishop of Winchester, Translation.*—Bishop (838–862) at the beginning of the monastic reforms, and the increase of the authority of Rome, which led to the struggle under Dunstan in the next century. He was buried, by his own desire, outside the Cathedral, where men might walk over his grave [that the 'sweet rain of heaven might fall upon his grave.' —Dr. Brewer]. After canonisation in 912, his remains were translated to a shrine in the Cathedral; and, according to the legend, the saint showed his anger by a rain which stopped the work for forty days. Hence the common belief that rain on St. Swithun's day presages a continued rain of forty days."

The following appeared in *Public Opinion* of July 20, 1894:—

"Sunday was St. Swithin's Day, and a good deal of rain fell in the country. In connection with the popular belief concerning St. Swithin's Day and the weather immediately following, the annexed statement, which was collated in 1861 from the observations at Greenwich for the twenty years preceding, will prove of interest at the present

* "The Equinoctial Gales. Do they occur in the British Isles?" By R. H. Scott, in vol. x., page 236 (1884) of the *Quarterly Journal* of the Royal Met. Society.

time. St. Swithin's Day was wet in 1841, and there were 23 rainy days up to August 24; in 1845, 26 rainy days; in 1851, 14 rainy days; in 1853, 18 rainy days; in 1854, 16 rainy days; and in 1856, 14 rainy days. In 1842 and the following years St. Swithin's Day was dry, and the result was: In 1842, 12 rainy days; 1843, 22 rainy days; in 1844, 20 rainy days; in 1846, 21 rainy days; in 1847, 17 rainy days; in 1848, 31 rainy days; in 1849, 20 rainy days; in 1850, 17 rainy days; in 1852, 19 rainy days; in 1855, 18 rainy days; in 1857, 14 rainy days; in 1858, 14 rainy days; in 1859, 13 rainy days; and in 1860, 29 rainy days. It thus appears from the average of the foregoing twenty years that the greatest number of rainy days after St. Swithin's Day occurred when July 15 was dry."

From the above statistics we find that on six occasions St. Swithin's Day was wet, and the *average* number of rainy days (up to August 24) which followed was 18½. In the remaining 14 years St. Swithin's Day was dry, and the *average* number of rainy days which followed was 19$\frac{1}{14}$.

The maximum number of rainy days was 31 (not 40, as the fallacy has it!), and this occurred in 1848, when St. Swithin's Day was *dry!*

The following is from the *Daily Mail* of September 28, 1896:—

"At the Weather Office.

"A *Daily Mail* reporter was on a Victoria Street omnibus on Saturday afternoon when a sudden and exceptionally heavy gust of wind seized his hat, whirled it high up in the air, and round and round, before dropping it in an open doorway. There its owner, having descended from the 'bus, secured it. In picking it up from the floor he saw upon the glass of the inner door the words, 'Meteorological Office.' Without hesitation he abandoned the unused balance of his penny fare and went inside to inquire into the scientific import of the phenomenon. 'What does it mean?' he asked when he had explained what had happened. 'Is it the equinoctial gale?'

Equinoctial Gales.

"The ever-courteous official—they are wonderfully courteous and informative at the Meteorological Office—grew almost angry. 'Equinoctial gales!' he said sternly, 'what are they? We don't believe in them here.'

"'Not believe in equinoctial gales!' said the reporter,

horrified at the heterodoxy. "The equinox has as much to do with causing the gales we get about this time of the year as the approaching close of the Earl's Court Exhibition. The sun crossed the line the other day, and we are getting these severe gales, but the two circumstances have no relation to one another. However, we do get gales about this time, and they are commonly called equinoctial gales.'

"'And we seem to be getting a lot of them?'

"'We are getting them a little earlier than usual, and we are getting them with unusual severity, but there is nothing much more to say of them.'

"At the Meteorological Office, where they deal in weather, they never wonder at anything. If a gale came whistling over Pimlico and blew the wood pavement up in Victoria Street they would just glance unconcernedly out of the window and casually remark that the south-eastern portion of the British Isles had been visited by a cyclonic disturbance, accompanied by a wind storm of unusual, but not exceptional, severity.

"'The odd thing has been,' the informative gentleman went on, 'that Scotland entirely escaped this gale. We had thought it necessary to issue a warning to those coasts, but the centre of the depression passed further south than had been expected, and the gale was confined to England, Ireland, and France.'

"'And the other gales?'

"'We have had three of them within the last few days. The first came on the night of September 17 to 18, and passed over the northern part of the kingdom, where they had severe gales from the S.E., S.W., and N.W. After that there was a temporary lull. But on Tuesday, September 22, came a second storm, which passed directly over the northern parts of Ireland and England, causing severe gales, and reaching Copenhagen on the morning of September 24. Now we are experiencing the third storm, which on Thursday night advanced rapidly, causing heavy gales all over England, Ireland, and France, with unusually, though not exceptionally, heavy rain. The fall of the barometer was exceptional, and the wind has shifted from the S. to the W. and N.W.'

"'And where is it shifting to now?'

"'The storm,' he said, 'is now, so far as we can see—so far as we can see, you understand—passing over, and a temporary clearing up and brightening is probable, with lower temperatures, and probably—probably, you understand—settled weather.'

"'But the wind pressure during these gales—has not that been remarkable?'

"'I cannot give the figures of wind pressure at present, but I may say that, although for this time of the year it may be said to have been unusual, it has not been exceptional.'

"'Abnormal, perhaps?'

"'Well, perhaps you might say abnormal—at this time of the year perhaps abnormal. But not exceptional.'

"So perhaps, after all, there has not been so much gale as we have all been thinking. At all events, it is comforting to hear of the settled weather in prospect."

The following is from the *Daily Mail* of October 24, 1896:—

"Autumn has abated her rigours and given us for the first time two fine days running. By that sign you may know that winter is arriving.

"You look around the town and find by a hundred circumstances that the indication is correctly interpreted. A *Daily Mail* reporter climbed up yesterday afternoon to the top of Parliament Hill. He was out of reach of the roar of the wheels, but from London down below there came floating up on the keen breeze a strange sound, which he recognised as vocal. Concentrating upon it all his attention, the far-off confused murmur seemed to separate itself into words. He distinguished first the word 'berries,' then the word 'winter.' Then he knew the rest. The sound was the effect of two or three millions of Londoners, saying in mighty chorus: 'From the great abundance of hawthorn and other berries upon the hedges I imagine we are going to have an unusually severe winter.'

Holly-berries and Severe Winter.

"At this time of the year the Londoner always says this. It is one of the signs by which you may know him. It would be interesting to know how it comes that just at the end of October or the beginning of November every true-born Londoner becomes possessed of the idea that there is

an unusual crop of hawthorn berries. You never hear him saying that root crops are unusually heavy or that there is great scarcity of keep for the cattle. He takes no interest in these matters. The one agricultural item which really touches him is the fact that the hawthorn berries are unusually abundant. It is possible that there does now and then come a year when the statement is true, though the probabilities are that as hips and haws have no market value they come generally in bounteous plenty. The inference he draws from the invariable phenomenon indicates rather his belief in the benevolence of Providence than any profound acquaintance with the natural laws which regulate the weather. But, however this may be, he repeats his familiar formula with unfailing punctuality in the last days of October, and though, as last year, his prophecy is only followed by a season innocent of a single skating day his faith in it is never shaken."

[Certainly up to January 5, 1897, we had seen nothing of the "unusually severe winter."—ED.]

The following article appeared in the *Daily Graphic* of January 11, 1897:—

"A CHAT AT THE METEOROLOGICAL OFFICE.

"There was cheerfulness about the Weather Office on Saturday which the raw dampness of the day outside was powerless to dispel. In Victoria Street people were hurrying along with mackintoshes and red noses, and the drivers were the only persons visible on the tops of the omnibuses; but in the Meteorological Office there was the serenity born of a conviction that, however much appearances might be against it, the worst of the winter was over. That is, at least, if averages and precedents go for anything; for the Meteorological Office has learnt by the experience hammered into it twice a day for 365 days in the year that you can never be quite certain about anything connected with the weather—except its past.

"But Mr. Brodie, who is a member of the Forecast Department and a Fellow of the Meteorological Society, after a careful consultation of the records of the Department for the past twenty-five years, was able to assure the *Daily Graphic's* inquirer that the precedents are much against any further severities on the part of the thermometer.

A Mild Winter follows a Mild December.

"'A mild December,' said he, 'has been generally followed by a mild January and February. A mild December and January has, with one exception, always been followed by a mild February during the last twenty-five years. Yes; I think you may say that, with the exception I have mentioned, the records go to show that if the weather continues mild up to this point in January it continues mild until the end of the chapter—the winter, I should say.'

"'What was the exception?'

"'It was in 1873, when a very mild December and a mild January were followed by a bitterly cold February: the mean temperature 4½° below the average.'

"'Which means——'

"'That the average temperature was only 3° above freezing point, and that therefore many of the nights were a good deal below freezing.'

"'And the instances of a mild December followed by a cold New Year?'

"'Were the winters of 1888-89—when a very mild December and a rather cold January were followed by a February that was relatively much colder—and the memorable instance of 1894-95.'

"'But in 1894-95 the cold set in earlier than this?'

"'Yes, it began to be cold about December 27, when the wind, which had been westerly, swung round to the northward, and the winter started with a gale and snow. The frost began with the New Year, but there was nothing very terrible in January: it was in February that the weather which burst all the water pipes set in.'

"'So that, to sum up, we are not quite out of the wood yet with regard to the winter, though the probabilities are against a severe frost. With regard to fog, however, our position is more favourable?'

Fog.

"'We have only had eight days of fog,' said Mr. Brodie, 'and we have passed through the worst month.'

"'Which is——?'

"'December. January is the next foggiest month to that, and October next to that. November, which is believed popularly to be the foggiest month, comes next—very low down on the scale, you see—and February next to that. The general tendency of fogs is to become scarcer in the latter part of the winter than in the later days of autumn.'

"'What is the average number of foggy days in a year?'

"'Twenty-five. But we have had very fogless winters since 1891, when there was a fog which lasted a week, and the whole number of foggy days was fifty. This year we have got through the worst part of the winter with only eight.'

"And, as Mr. Brodie remarked, on not one of the eight have we had a real fog of the blackest and most stifling blend."

We cannot do better than end with the following, which appeared in *Nature* on August 20, 1896:—

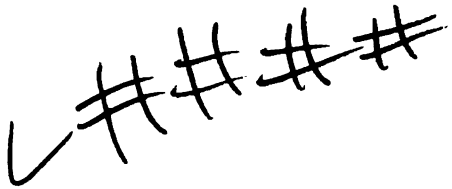
Rain-making.

"A correspondent at Johannesburg has sent us a report, from the Johannesburg *Star*, of some amusing speeches recently made in the Volksraad on the subject of rain-making experiments. It would be a pity to let the richness of the utterances of the members of the Raad be the cause of merely local merriment, so we subjoin the report, trusting that sacrilegious meteorologists will give it their consideration. The report is as follows: 'The debate on the memorials from Krugersdorp, requesting the Raad to pass an Act to prevent charges of dynamite being fired into the clouds for rain, was continued. Mr. A. D. Wolmarans spoke in favour of his proposal, and denounced the action of certain persons at Johannesburg as invoking the wrath of God. Mr. Birkenstock said there was nothing irreligious or sacrilegious in these experiments; they were purely scientific experiments. When lightning-conductors were first invented, the same objections were raised against their use. This was not a subject for the Raad to deal with, and he moved as an amendment that the Report of the Memorial Committee to decline to interfere be adopted. The chairman said it was a monstrous thing to shoot into the clouds; it was nothing less than defiance of the Almighty; it should be made a criminal offence. Mr. Labuschagne was of the opinion that the offenders should be imprisoned. After a further discussion it was resolved, by fifteen to ten votes, to instruct the Government to draft a law to prevent such things happening in future, and submit it this session.'"

While the last paragraph appears ludicrous, we may admire the spirit in which the objections were made; but if the opposition in such cases is due merely to ignorance and

conservatism, then we have no spark of sympathy for such people. Railways were opposed in a most senseless manner. Much ignorant prejudice has been and is being displayed with regard to motor cars and the higher education of women, and the author has heard it said that it is wicked to make and use electricity, and that "we are not meant to fly"!

GENERAL MISINFORMATION



GENERAL MISINFORMATION

That Cannibals eat Human Flesh Raw

ON this subject Captain S. L. Hinde said at a meeting of the British Association at Ipswich in September, 1895: "It is remarkable that, contrary to an ignorant and yet very generally accepted theory, the negro man-eater never eats flesh raw, and certainly takes human flesh as food purely and simply."

The whole report being interesting, we give it in full as it appeared in the *Globe* of September 16, 1895:—

"CANNIBALISM ON THE CONGO.

"Speaking at the British Association at Ipswich on Saturday, Captain S. L. Hinde, who has been travelling and fighting for some years in the Congo basin, said that almost all the races on the Congo practise cannibalism, and, though in some parts it is prevented by the presence of white civilisation, in others it seems to be on the increase. An extensive traffic in human flesh prevails in many districts, slaves being kept and sold as an article of food. The different tribes have various and horrible methods of preparing the flesh for eating; in some instances, before the death of the victim, certain tribes of the Bangala race themselves acknowledge that they break the arms and legs of the victim, and place the body thus mutilated and still living in water for two or three days, on the supposition that this pre-mortem treatment renders the flesh more palatable. There are also distinct tribal preferences for various parts of the body, and it is remarkable that, contrary to an ignorant yet very generally accepted theory, the negro man-eater never eats flesh raw, and certainly takes human flesh as food purely and simply, and not from any religious or superstitious reasons. In the country of the Balétéla one saw neither gray-haired persons, halt, maimed, nor blind. Even parents were eaten by their children on the approach of the least sign of old

age. Under such circumstances the Balétéla were a splendid race. After a fight the native camp-followers of his expedition invariably ate up all the dead, leaving absolutely nothing for the jackals. In this way they undoubtedly saved the expedition from many an epidemic. With regard to the pygmies, he said their average height was under 4 ft., and it was as difficult to detect their presence in the forest as it would be to find a mouse in a cornfield. They were a nomadic race, and, being hunters, followed the game in its migration through the forest according to the season. They were courageous, pugnacious, and had an intimate knowledge of poisons. Death succeeded in from three to ten minutes after a scratch was made by one of their tiny poisoned arrows.

"Mr. Elworthy said he appeared in the character of 'devil's advocate,' and thought there was something to be said in favour of cannibalism. Underlying it was the primeval idea that the body imbibed the properties of that which it ate. Upon that idea—and with all possible reverence he said it—was founded one of the most solemn of our Christian rites. In one part of France even now the last of the harvest corn was baked into a loaf made in the form of a human figure. This was supposed to represent the spirit of the corn—the spirit of vegetation, reproduction, fertility—and was broken up, distributed among the villagers, and eaten."

Apropos of this subject may we be allowed to refer to the story of the man with a cork leg who was shipwrecked on a cannibal island? He saw preparations being made for the feast of which he was to be the *pièce de résistance*, and with commendable presence of mind he asked the chief (? *chef*) if he did not think it would be as well if he tasted a sample first. The chief thought it an excellent suggestion, and so the man held up his cork leg while a sample was cut from it. The chief decided the man was too old, tough and tasteless, and so his life was spared.

That Sheet Lightning is another kind of Lightning different from Forked Lightning

When a cloud is momentarily brilliantly illuminated and no thunder is heard, the phenomenon is called sheet lightning. This brilliant illumination is caused by a distant

forked lightning discharge which is hidden from direct view either by the clouds, a mountain, or the curvature of the earth. This discharge is so distant that the sound of the thunder does not reach us, particularly if the wind be blowing from us.

Of course occasionally we have the sheet lightning appearance, and do hear the thunder to a slight extent.

That it is possible to Cut any Name with your Skates on the Ice when Skating

Now the author feels completely out of his depth, or rather he would be if the ice were to break, for on ice he cannot always control even his "best leg" sufficiently to "put it forward"! However, a skating friend who is also a figure skater, assures him that this is a fallacy, in spite of the advertisement pictures we saw some winters ago in praise of certain lozenges [No, *not* pills this time!] in which a fair skater, the observed of all observers, was marking a complete legend on the ice with her skates.

That the term "Uncut," used by Publishers and Booksellers, means that the Leaves are United at their Edges

When the leaves of a book are united at their edges, owing to the folding of the sheets of paper on which the book is printed, it is said to be *unopened;* but when a book is *uncut* the leaves vary slightly in width, so that their edges do not form a continuous line, and this is because the book was not put in a cutting machine (guillotine). This machine has a long knife which moves vertically up and down, and cuts through the whole thickness of the book at once. Personally, we think an uncut book is inconvenient, for we cannot pass the leaves rapidly one by one from under the thumb when looking through the work for some page or paragraph. If one tries to do this with an uncut book the leaves go over in parcels of four or more at a time.

The terms page and leaf are very often used as if they were synonyms, but there ought to be no confusion here; if you take a single thickness of paper and tear it out of a book, you tear out one *leaf*, each side of which is a *page;* that is, there are two pages to every leaf. The German who had a private lending library was well acquainted with these two terms. When the books were brought

back he used to examine them carefully to see whether any damage had been done. On one occasion he found a hole on page 19, and turning the leaf over he said, "And see here, there is another on page 20," and proceeded to charge for both!

That a Locomotive Driver Guides the Train as well as Drives it

By the above is meant that the driver can, if he so desire, change from one pair of rails (technically known as the metals) to another. This is quite a mistake. The driver can only go forward, or backward, or stop still with his train; and, of course, he has the power to vary the speed. If a train has to change from one pair of rails to another, the *points* (as the arrangement at the crossing is termed) have to be suitably set so as to engage with the flanges on the rims of the wheels of the engine and carriages. The control of these points, and also of the signals (semaphores), is in the hands of the man in the signal box, and his is a very responsible position. Automatic signalling is now rapidly coming into use.

If a locomotive were placed on a large flat iron floor, the driver would be quite powerless to cause it to move in a straight or curved line at will, for such engines are entirely without any steering gear such as is possessed by traction-engines, steam-rollers, and motor-cars. The arrangement of the two front wheels on two bell-cranks (instead of on one continuous axle), which is almost universal in the case of motor-cars, is due to the author's great-grandfather, who patented the invention on January 27, 1818, the number of the patent being 4,212. The old gentleman (who also introduced lithography into England) was evidently much before his time, for it was never used commercially until motor-cars came in, and had the patent been taken out only 10 years ago, it would have been one of the most financially successful. Although invented nearly 90 years ago, the mechanism is well-known by the inventor's name as the Ackermann gear.

That one-third of a tumblerful of Whisky is not so Intoxicating if the glass be filled up with Water

"Diluted spirits act less rapidly than neat spirits, but if taken in the same period the remote intoxicating effects will not be appreciably different; of course, the local action

on the stomach and liver will be more intense in the case of the neat spirit."—Dr. J. J. Ridge.

That a Cork "Tall Hat" is made of Cork

When we look inside one of these so-called cork hats we see the surface of a very thin layer of cork, which is used instead of the usual white silk to line the hat, though the latter is not stuck down in the same manner. In either case the main body of the hat is of the same materials, viz. linen, shellac, and silk.

That the so-called "Dutch Clocks" are made in Holland

"The wooden clocks which we erroneously call 'Dutch' are nearly all made in the Black Forest, and are, indeed, German clocks. The village of Freyburg is in the centre of this manufacture, whence wooden clocks are exported 'to the number,' it is said, 'of 180,000 yearly, under the name of *Dutch clocks*, not only throughout Europe, but even to America and China.' Shakespeare, with his wonted accuracy (*Love's Labour's Lost*, act iii., scene i.), calls these clocks rightly, thus:—

"'A woman, that is like a German clock,
Still a-repairing, ever out of frame,
And never going aright.'"

J. Timbs, F.S.A.

That being a M.R.C.S. and a L.R.C.P. entitles a Man to prefix "Dr." to his Name on his Card and Plate

No title is more incorrectly used than that of "Doctor." The doctorate of medicine was one of the first to be instituted, and hence the terms "doctor" and "medical man," or "physician" are commonly used as synonyms. This is not strictly correct, and it is worse to apply the title of "doctor" to a surgeon, though this is most commonly done.

The Royal College of Surgeons issues two diplomas:

(1) To Fellows of the R.S.C. [F.R.S.C.], and
(2) To Members of the R.S.C. [M.R.C.S.],

the former being the higher qualification.

The Royal College of Physicians issues three diplomas:

(1) Fellow of the R.C.P. [F.R.C.P.],
(2) Member of the R.C.P. [M.R.C.P.], and
(3) Licentiate of the R.C.P. [L.R.C.P.],

the Fellowship ranking higher than the Membership, and the Membership higher than the Licentiateship.

None of the above five diplomas, or any other like them issued by other societies, confers the title of "Doctor" upon the individual holding it. The doctorate of medicine, like the doctorates in all the other faculties, is a degree conferred by a University either *honoris causâ*, or on the result of an examination [as is usually the case with *all* the degrees at the University of London]. When a candidate has obtained any one of the doctorates (or the B.A., B.Sc., etc., degrees) by examination, he is said to have *graduated* at such and such a University, and in such and such a faculty. There are doctorates of Divinity, Medicine, Law, Engineering, Science, Music, Philosophy, Literature, etc., and anyone having gained one or more of these is entitled to call himself "Doctor Dash," and to be addressed as such.

Hence we see that while *all* the medical men and surgeons on the British Medical Register are *qualified* practitioners, only a small percentage of them have *graduated* M.D. or M.B. By courtesy a person who holds the M.B. degree is addressed as "doctor."

In this connection it is interesting to note that on the authority of Dr. Brewer ("Dictionary of Phrase and Fable") graduates of Universities not in holy orders are legally entitled to the appellation "Esquire."

That the Rhone passes through the Lake of Geneva with such Velocity as not to mingle with its waters

John Timbs, F.S.A., in his "Popular Errors," has the following note:—

"John Evelyn in his 'Diary' repeats the so-often-repeated assertion that the Rhone passes through the Lake of Geneva with such velocity as not to mingle with its waters. Of all the fables which credulity delights to believe and propagate, this should appear the most impossible to obtain belief; for the Rhone, when it enters the lake, is both the colour and consistency of pea-soup, and it issues out of it perfectly clear, and of so deep a blue that no traveller can ever have beheld it without astonishment. Evelyn had seen it in both places, and yet repeats the common story, which, had it been fact instead of fable,

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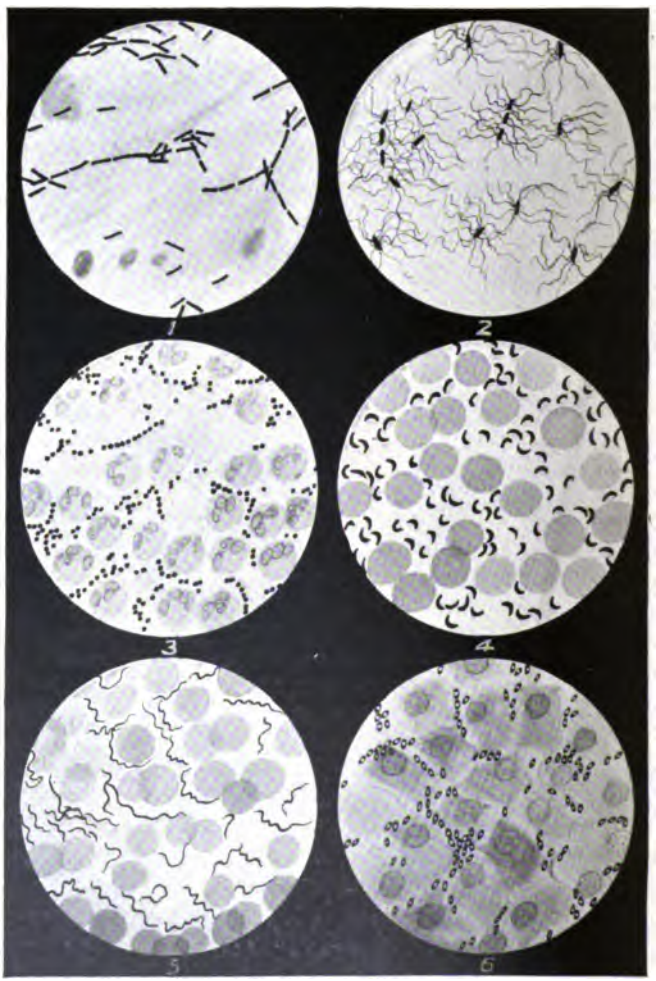

BACTERIA.

1. TUBERCLE BACILLI IN EXPECTORATION. 2. TETANUS BACILLI (LOCKJAW) FROM A CULTURE. 3. MICROCOCCI IN PUS FROM ABSCESS. 4. CHOLERA BACILLI IN BLOOD. 5. SPIRILLA IN BLOOD. 6. BUBONIC PLAGUE BACILLI.

would have been less remarkable than the actual, and as yet unexplained phenomenon of its colour at Geneva."

Prof. Tyndall's explanation of the colour is that it is due to the large number of very fine particles of matter in suspension, and he verified this by experiment.

The following letter appeared in the *Daily Mail* of August 24, 1906:—

"PROBLEM OF THE RHONE.

"SIR,—It may be that some scientific correspondent can explain questions which I found recently are interesting so many *Daily Mail* readers in Switzerland, and which afford topics of discussion at innumerable hotels.

"The Rhone, the largest stream of glacier water in Europe, hurls itself, turbulent and discoloured, into Lake Leman, but is no sooner there than it issues forth again like a clear river of diamonds. Does precipitation alone account for the whole of this phenomenon, and does the stream flow along the middle or bottom of the lake, and not at its sides?

"J. LANDFEAR LUCAS.

"Junior Constitutional Club, Piccadilly, W."

That Indian Ink and Indiarubber come from India

Indian ink does not come from India, and never did. It came originally from China, and so should be called Chinese ink, as, indeed, it is in France. There is scope for improvement, too, in indiarubber; that comes from America, and is no more Indian than the Red Indian is. The latter is not red, either; when washed—but that is seldom—his skin is brown; and although a nigger should, according to his name, be a black man, he is not black, but only a dark shade of brown.

That Bacilli, Microbes, or Disease Germs, belong to the Animal Kingdom

We hear as much nowadays about microbes as we do about cycles, cyclists, anticyclones, motor cars, suffragettes and passive resisters! Microbes, germs, bacteria, bacilli, animalcules, and micro-organisms are all names vulgarly used for the same thing. The name *bacteria* is derived from a Greek word meaning "rod-like," and *bacilli* is from a Latin word with the same meaning. Hence more strictly

the terms bacteria and bacilli are only applied to those micro-organisms which are rod-like in form. If they are spheroidal in form they are called *micrococci;* if spiral, *spirilla.* Germs, microbes, and micro-organisms may be used as synonyms, but the last term is to be preferred.

Many of these micro-organisms are furnished with excessively delicate thread-like processes *(flagella)* which may be likened to the roots of higher plants, they feed on animal matter, and have cellulose cell-walls, and for these and other reasons too technical to enumerate, scientists consider these organisms to belong to the Vegetable Kingdom.

As to their size, Dr. Percy Frankland, F.R.S., remarks that four hundred million of them can lie quite comfortably without overlapping on one square inch of surface! This is 100 times the population of London, which has an area of some 80 square *miles.*

To show how wonderfully "up-to-date" some criminals are, we give the following cablegram from New York which appeared in the *Daily Telegraph* a few years ago:—

"An exciting incident occurred in a Third-avenue cable-car this morning. It was crowded with passengers at the time, and as a man was leaving it he threw three small phials among the passengers who were sitting in the car. They picked up the bottles, and found them to be labelled respectively 'Diphtheria,' 'Pneumonia,' and 'Cholera.' The distributor exclaimed that there were enough disease germs in the bottles to kill a cityful of people. This caused a stampede, and in the frantic struggles of the passengers to get out of the car, one woman had her leg broken. The phials were secured, and when their contents were analysed later in the day, it was ascertained that they really did contain the germs of the diseases whose names they bore. The man who threw the bottles escaped in the confusion."

It would be interesting to know whether any of the passengers developed any of the above diseases. No doubt they all thought they had the symptoms of all three diseases at once!

The moral of this story is that evidently the public do not think that the "micro-organism theory of disease" is all rubbish!

It may be well to mention here that animalcula (Latin,

little animals) belong to the Animal Kingdom, but they are entirely different from bacilli, being perhaps 100 and 1,000 fold larger, more highly organised, non-pathogenic, and belonging, as we have said, to another kingdom.

Examples of animalcula are:—Vorticella, Rotifera, Cyclops, and Hydra.

In conclusion, there is some confusion as to whether "animalcula" is singular or plural, and when it is thought to be singular, the incorrect form "animalculæ" is written for the plural.

Singular.	*Plural.*
Animalculum,	Animalcula.
Animalcule,	Animalcules.
Bacillus,	Bacilli.
Bacterium,	Bacteria.
Microbe,	Microbes.
Microbion,	Microbia.

That there is a Cavity in Nelson's Cocked Hat on his Statue in Trafalgar Square, in which there are Pewter Pots, Coins, etc.

This idea may have arisen from the practice of putting newspapers and coins under some foundation stones when publicly laid.

When the steeple-jack, Harrison, was making the arrangements for decorating the Nelson Column on Trafalgar Day (October 21, 1896), he was asked about this matter, and said there were no such things up there.

That the celebrated Chinese Rice-paper used for painting upon by the Chinese and Japanese is made from any part of the Rice Plant

The so-called "rice-paper" used by Japanese and Chinese artists is certainly not made from rice or the rice plant, and it is not even paper in the usual acceptance of the word, for it is *pith*. The pith of the *Fatsia papyrifera* is from one to one and a half inches in diameter, and it is sliced into thin rolls, by a knife as broad as the roll is long, in a manner similar to that in which wood veneer is made. The sheet is then unrolled, dried flat under pressure, and is then ready for use.

Anyone who has examined a sheet of this pith will at once recognise that it is quite unsuitable for making cigarette papers, being too thick and delicate for the purpose.

Paper can be and is made from the straw of rice, but it is a very different article from that which is known erroneously as rice-paper.

That the letters F.S.A. appended to a Man's Name, imply that he is a Fellow of the Society of Arts

The Society of Arts (John Street, Adelphi, London) has a larger membership and is more widely known than the Society of Antiquaries (Burlington House, London), consequently the mistake; but the Society of Arts has only a class of Members, while the Society of Antiquaries has only a class of Fellows, and F.S.A. means "Fellow of the Society of Antiquaries," while M.S.A. may be "Member of the Society of Arts" (which has no professional value), or "Member of the Society of Architects" (which has a professional value).

That the Albert Hall, London, is Circular in Plan

It is not; it is elliptical or oval, being longer from north to south than from east to west. This is noticeably so if the area be looked at carefully from the gallery. It may be seen by referring to a plan of the building, such as may be found on the ten-inch ordnance map of London.

That a Country Dance has any special reference to the Country

The term is a corruption of "contra-dance," from Latin, *contra,* opposite, and means a dance in which the partners are arranged in lines facing one another.

That Camels' Hair Brushes are made from the Hair of Camels

The hair of camels is used for making very fine fabrics, especially shawls, but also carpets and tent-cloths. It is also used for mixing with silk, but it is *not* used for making the brushes, called "camels' hair brushes," used by engineers, architects, and artists, these being made of hair from the tails of Russian and Siberian squirrels.

That Newspapers can be Registered for Transmission Abroad, and that when so Registered they are Transmissible to the Colonies for a Postage of Halfpenny per Copy, irrespective of Weight, as is the case with a Paper Registered for Transmission in the United Kingdom

This fallacy, dealing as it does with official regulations which are fearfully and wonderfully made and not to be

understanded of the people, was too much for us to attack single-handed, so we appealed to Cæsar and received the following reply:—

"General Post Office, London.
"August 15, 1899.

"SIR,—In reply to your letter of the 12th inst., I am directed to inform you that publications which are registered at the General Post Office as newspapers, under the arrangement to which the enclosed notice refers, are transmissible in the United Kingdom for a postage of ½d. per copy, irrespective of weight. There is no system of newspaper registration for transmission abroad.

"I am, Sir, your obedient servant,
(Signed) "J. SWAINSON.

"A. S. E. Ackermann, Esq."

That all kinds of Bacteria or Bacilli and their Spores can be Killed by Boiling them in Water for a Few Minutes

In answer to the author's letter on the subject, Mr. S. L. Mosley, the curator of the Huddersfield Museum, kindly replied, on November 24, 1896, as follows:—

"Dry fungus spores have been heated to 120° C. (248° F.) without being killed. Some bacteria are said to resist boiling. Dr. Dallinger educated monads, which usually live at 18° C. (64½° F.), to live and thrive at 70° C. (158° F.)."

It is significant also that Colonel J. Lane Notter, M.D., and Colonel Pitt-Firth, F.R.C.S., in their "Hygiene," say: "Practical experience goes to show that an exposure to 220° F. for eight hours, or 250° F. for one hour, or 270° F. for a quarter of an hour is sufficient to disinfect ordinary infected materials."

That Briar Pipes are made from the Roots of Sweet-briar

Sweet-briar (*Rosa rubiginosa*) is a variety of rose, and its roots are *not* used for the manufacture of pipes, because for one reason they are too small for the purpose.

Briar pipes are made out of the roots of a white heath (*Erica arborea*), which grows to a considerable size, and is cultivated in the South of France for the purpose. The name is derived from the French "*bruyère*," dialect "*brière*," meaning heath.

The word briar by itself has a rather indefinite meaning,

being defined as "a prickly plant or shrub in general; specifically, the sweet-briar or green briar." The latter is *Smilax rotundifolia*, a greenish-yellow climbing plant with prickly stem and thick leaves.

That a Policeman's Activity in Prosecuting Cases affects his Promotion

This fallacy was prominently and authoritatively dealt with before the Royal Commission on the working of the Police regulations, and was reported on page 9 of the *Daily Telegraph* of July 18, 1906.

Sir Edward Henry, the Chief Commissioner of Police, was being examined, and made these remarks:—

"*I have often seen it stated that a constable's activity in prosecuting cases affects his promotion. This is quite inaccurate.* A constable's activity or otherwise with regard to arresting or prosecuting persons is not taken into account at all in considering the question of promotion. Our rule is that no promotion is given except as the result of an examination held at New Scotland Yard, written and oral, by an examining board consisting of a chief constable and four superintendents, supplemented by an examination independently held by the Civil Service Commissioners. During the time that I have been Commissioner I know of only two cases in which promotion was given without such examination, and in one of these the candidate passed in his professional examination but failed before the Civil Service Commissioners. The number of promotions each year would aggregate about 400. Every constable with five years' or more blameless service to his credit is eligible for promotion, and can apply to be permitted to compete at these examinations. There is no special record kept of the cases in which constables are concerned. If I wanted to know what work in connection with cases any individual of the force had done I should have to call for a very lengthy and tedious search to be made amongst the registers in order to arrive at the information. *Our rule is well known to all the men engaged, and no inducement of any sort or kind is held out to them to be unduly active in relation to arrests or prosecutions of individuals.* On the other hand, it is well recognised that the bringing of charges involves inconvenience and loss of rest to the officer concerned."

That Venetian Glass is all made in Venice

It is nearly all made in Murano, near Venice, and all the modern glass-works are there. Mr. C. E. Clark points out that the peculiar sand required for its manufacture is not found at Venice.

That Dresden China is made in Dresden

To begin with, the word "china" is usually incorrectly used in place of the word "porcelain." We should say "Dresden porcelain," "Royal Worcester porcelain," "Sèvres porcelain," etc., for "china" is strictly applicable only to porcelain made in China. Well, Dresden porcelain is made at the royal factory of Meissen, near Dresden, in Saxony, and it was first made there in the year 1707. The early makes are commonly known as "*vieux Saxe.*"

That Axminster, Brussels, and Wilton Carpets are all made in Axminster, Brussels, and Wilton respectively

All these names have been applied to the particular makes of carpet which they imply because *originally* these particular types came from the towns after which they are still named. There are, of course, numbers of similar instances in connection with other manufactured goods. For example, Dutch clocks are made in Germany, and this mistake has arisen from the mispronunciation (followed by the mis-spelling) of "Deutsch," the German word meaning "German."

That the Plovers' Eggs of Commerce are Laid by the Birds called Plovers

It is passing strange that, though there are at least *thirty-two birds* with double-barrelled names, the second of which is "plover"—*e.g.* golden-plover, Norfolk-plover, whistling-plover, etc.—it is *not* the eggs of any of these which are sold as the well-known delicacy! The so-called "plovers' eggs" are the eggs of the lapwing (*Vannellus cristatus*). The well-known naturalist, the Rev. J. G. Wood, is quite definite on this point, and so is the "Century Dictionary," under "plover." To add further to the confusion, the lapwing (*Vannellus cristatus*) is also called a peewit. The only connection between the plover and the lapwing is that they both belong to the family *Charadriidæ;* but while the plover is in the genus *Charadrius* (being

Charadrius pluvialis) the lapwing is in the genus *Vannellus*, a difference sufficiently clear not to warrant the confusion that exists, especially as each of the birds has a simple and well-known vulgar name.

That a Quart Bottle has a Capacity of Two Pints

This is a fallacy many a fraudulent tradesman is only too anxious to keep up. In the Cape it is (or used to be when the writer was there twenty years ago) quite as usual to hear the words, "six bottles one gallon," as it is in England to hear "eight pints one gallon." The bottles referred to in the Cape are the same that are known in England as "quart bottles," therefore each holds only one and one-third pint, instead of two, as the name quart leads us to suppose.

When the simple metrical system of weights and measures is in use in England such inconsistencies as the one named will be practically impossible, and fraud based on our confused and gigantic anti-system will be made far more difficult.

That Jutland is so named because it juts into the Sea

The author remembers being given the above explanation when at school. It really means the land of the Jutes, these being a Low German tribe originally inhabiting Jutland.

That the "Land o' the Leal" means Scotland

Miss L. P. Steele-Hutton, M.A., writes:—

"'Land o' the Leal' isn't Scotland, but Heaven! and though I am Scotch, I admit that it isn't quite the same thing!"

The "Cyclopædia of Names" explanation is:—

"A mythical land of happiness. Lady Nairne, in her poem of that name, uses it for Heaven, and the use has now become an accepted one."

That the "Heart of Midlothian" means Edinburgh

Miss L. P. Steele-Hutton, M.A., writes:—

"'Heart of Midlothian' is not Edinburgh, but the old jail of that city. Some mere Englishman once, bent on saying something pretty in a public speech about Mr. Gladstone, hoped he would soon return to the 'Heart of Midlothian'!"

The "Cyclopædia of Names" reference is:—

"A novel by Sir Walter Scott, published in 1818; so-called from the popular name of the Tolbooth, an Edinburgh prison, demolished in 1817."

That Frankenstein was a Monster as is implied in the phrase, "The monster Frankenstein"

"Frankenstein" was a romance written by Mrs. Mary Shelley and published in 1818. The hero's name was Frankenstein. He was a medical student who created a monstrous being from materials gathered from tombs and the dissecting rooms. When the creature was complete with bones, muscles, and skin, it acquired life and committed atrocious crimes, including the murdering of a friend of Frankenstein and the strangling of his bride. It came to an end in the northern seas.—Tuckerman, "History of English Prose and Fiction," page 319.

That Breaking a Saucer or Extinguishing a Candle are part of the Chinese forms of Taking an Oath

This matter was dealt with in the Thames Police Court, before the magistrate, Mr. Mead, on September 11, 1906, and it was reported in the *Daily Chronicle* of September 12, 1906. Mr. Mead said: "I believe these two ceremonies were invented by Englishmen, and are not in vogue in the Chinese Courts. They have nothing to do with Chinese religious belief." Mr. Pearson, who interpreted, said that he had been a missionary in China for thirty-two years, and had never seen an oath administered by breaking a saucer. The principal and most binding form of oath was the cutting off of a fowl's head.

That Tobacco Smoke is a Disinfectant

This is certainly a popular notion if nothing else. Drs. Notter and Firth, in their work on "Hygiene," page 293, speak in no uncertain tone on this matter:—

"A bad smell is of importance as indicating the existence and presence of microbes; the mere smell can usually be disguised, removed, or hidden by such deodorants as eau-de-Cologne, camphor, sanitas, or even tobacco smoke; but these would all be useless as a means of removing or destroying the germs which are the cause of the bad-smelling gases."

There is one broad generalisation which will save much misconception on the subject of disinfection, and that is that anything which will kill pathogenic micro-organisms will also kill human life. Hence putting whisky into water to "kill the germs" and smoking to disinfect the air are dangerous fallacies, because they give a false sense of security and prevent proper precautions being taken.

That Hackney Coaches were so named because they were first made in Hackney, London

This is not so. The word comes in a rather roundabout way from the French, "*haquenée*," an ambling horse. A long account of the derivation is given in the "Century Dictionary," *q.v.*

That Meerschaum is Consolidated Sea-Foam

The word is a German one meaning literally "sea-foam," but the substance is really a hydrated silicate of magnesium, occurring in fine white clay-like masses. The name refers to the lightness and snow-white colour of the material.

SOME MISNOMERS.

Many of our readers probably live in the N.W. district of London; if so, they will know Harrington Square. Now, a square has usually four sides—Harrington Square has but three; a square should have a right angle, indeed, four, but this "square" has no such thing, being, in fact, an obtuse-angled triangle. Why, then, was it called a square? Euston Square, again, is an oblong; Coffin Square is an oval; Maitland Park is not a park, and never had any park other than Regent's Park, which is over a mile away, near it; and Chalset Terrace, N.W., is about as much a terrace as Maitland Park is a park.

A chandelier is the name given to a gas-bracket with many branches; but it means a candle-holder. Milestones are, in most cases, made of iron nowadays; and telegraphy means *writing* at a distance, but the name given to the instrument which reproduces writing at a distance is called a telautograph; whilst the instrument termed a "life-preserver," being made for the express purpose of dealing a stunning or death blow, should be called a death-producer or something of that kind, certainly not a life-preserver.

A millepede should have a thousand feet, but they are

not often found with more than one hundred; and a centipede should have a hundred feet, but, as a matter of fact, they have about fifty, and the largest species (the forked centipede [*Lithobius forficatus*]) in this country only has thirty feet. Again, the anterior abdominal vein of a frog is posterior, and "speaking through the nose" occurs when the nasal passage is closed! Try saying "When the nasal passage is closed," while holding your nasal organ.

We all know the so-called easy-chair is, in nine cases out of ten, not comfortable, and is anything but easy to get out of or into, especially for those suffering from rheumatism; whilst as to the majority of so-called safety matches of the present day, they can be struck against one another or on a pane of glass, and on several other substances—in fact, on nearly everything except the box itself; and when they do strike on the box, they are only safe to splutter over the face and fingers of the unfortunate striker, when he finally succeeds in getting one to strike, and not to keep on strike.

The trumpet lily, lily of the Nile, or pig lily, as it is called at the Cape (*Richardia Africana*), is *not* a lily. It belongs to the order *Aroideæ* or *Araceæ*. The other members of the order are:—

(1) The Cuckoo Pint, Wake Robin, or Lords and Ladies (*Arum maculatum*).
(2) *Arum montanum.*
(3) The "Taro" (*Colocasia antiquorum*).
(4) *Amorphophallus campanulatus.*

The chief characteristics of the order are the showy spathe and spadix which together form what is popularly called the flower, but in reality there are many flowers, and these are situated upon the spadix, which is the club-shaped inner portion.

Silk-worms are *not* worms, but caterpillars.

Heart-burn has nothing to do with the heart.

Sweet spirits of nitre does not contain any nitre.

Marmalade is a misnomer, for it does *not* contain any quince, whereas the word is derived from the Portuguese word "*marmélo*," a quince.

Matinée (French, *matin*, morning) is a misnomer as a rule, for it is usually applied to a performance taking place in the afternoon.

It is a misnomer to say that the sun *rises*, that the kettle boils, and that the "glass," or barometer, is falling.

The day when a boy (or girl) becomes twelve years old is frequently spoken of as his "twelfth birthday." It is, of course, his thirteenth birthday, or, more correctly, it is the twelfth anniversary of his birthday.

The expression "drinks like a fish" is a misnomer, for the large volume of water that fish take in at their mouths is *not* drunk; it is passed out through their gills, the action corresponding to respiration in mammals.

"Galvanised" iron is not galvanised, *i.e.* the process does not include the use of electricity. It is iron cleaned and dipped in molten zinc.

Sealing-wax has not any *wax* in its composition.

"Under weigh" is incorrect, and is due to confusion with the phrase "to weigh anchor." "Weigh" in the latter sense means "to raise or lift," but when a ship begins to move we may say she is "under way."

"Electric accumulators or electric storage battery." Another name for the same thing is "secondary battery," and this is less open to objection. A secondary battery does not accumulate or store electricity *per se*. On being "charged" with electricity the plates and fluid in such a battery undergo a complicated chemical change, so that the electrical energy is stored in the form of chemical energy. This chemical energy is in such a form that it is readily available for rapid conversion into electrical energy when the latter is required.

Cantharides, *i.e.* Spanish fly. This is a misnomer because the insect is *not* a fly but a beetle.

For more "Misnomers" *vide* Dr. Brewer's "Dictionary of Phrase and Fable," which has two and a half pages of them under "M."

MIŞCELLANEA

MISCELLANEA

"Golden Rules for Discriminating Truth in Human Inquiries."

SIR RICHARD PHILLIPS, a former editor of the *Monthly Magazine*, and author of a "Dictionary of the Arts of Life and Civilisation," has left the following "Golden Rules" for the detection of popular superstition :—*

"The radical errors of savages consist in mistaking causes : in considering dreams as inspiration ; in considering medicines as charms, and charms as medicines ; in considering their personal good as the special act of some kind genius, and their personal evils as the act of some malevolent genius, in yielding their judgments to such hasty faith, and in implanting such faith in their children ; till, by accumulation and acceleration, the whole becomes a system, and an integral part of the minds of themselves and their successors.

"These errors do not consist of one practice more than another : as whether a reptile is adored as the fetisch of a nation ; or a monstrous idol as its protector ; or an unsculptured god clothed with human sentiments, caprices, and passions ; or whether stars, or gods and goddesses, or luck and ill-luck, or fate and destiny, or charms and miracles, or incantations and invocations : the principle of erroneous superstition is the same whenever a cause of a material effect is assumed which is not material, connected, commensurate, and mechanical.

"A dream has no mechanical connection with the things of which it is an alleged sign ; a charm has no mechanical connection with the things over which it is assumed to have power. African fetisches, or oriental idols, have no mechanical connection with the things which they are said to influence ; witchery or enchantment, the planets, the entrails of animals, sacred omens, chemical action, and sediments of

* From "Golden Rules of Social Philosophy ; or, a New System of Practical Ethics." By Sir Richard Phillips. Printed for the Author 1826.

tea-cups, have no mechanical energy, or commensurate connection with their pretended effects; and therefore are superstitious absurdities.

"All doctrines of causation are absurd and superstitious when there is no possible or mechanical connection between the cause assumed and the effect produced.

"Thus it is absurd and superstitious to assert that a rod or wand can by its touch transform one substance into another, because there is no operation on the substance by such means by which it can be so converted.

"It is absurd and superstitious to allege that there are lucky seats in gaming, because there is no connection between the seats and the accidents of the cards or dice.

"It is absurd and superstitious to ascribe the power of foretelling to dreams, or planets, or sediments of tea-cups, or entrails of animals, because there is no connection between the same and the events with which they are said to be coincident.

"It is absurd and superstitious to ascribe cures to touching, or diseases to witchcraft, because the substance in either case is not changed by the touch of the healer or the witch.

"It is absurd and superstitious to believe in the appearance or noises of ghosts and pretended spirits of the dead; for nothing but what is material can be an object of sense, or can act so as to affect light or sound: all such appearances, as a matter of fact, must therefore be referred to illusions of the mind, or to disordered or mistaken affections of the sense, assisted by implicit faith in the possibility of the phantom.

"It is absurd and superstitious to attach any luck or ill-luck to days of the month; for days are but similar revolutions of the earth in circles of space, which never return to the same point, and which are perfectly indifferent to actions of men and the contingency of their unconnected fortunes.

"It is absurd and superstitious to consider events unconnected as signs or omens of each other's occurring, or to consider events as governed by any coincidences with other events, when there is no mechanical connection, as cause and effect, and often no connection either in kind or species."

Character of the Superstitious.

The pious and learned Bishop Hall (who was the friend of Sir Thomas Browne) has left us the following pictures-in-little of the superstitions of his times, in his "Characters of Vices":—

"Superstition is godless religion, devout impiety. The superstitious is fond in observation, servile in fear: he worships God but as he lists; he gives God what he asks not; more than he asks, and all but what he should give; and makes more sins than the ten commandments. This man dares not stir forth till his breast be crossed and his face sprinkled. If but a hare cross him in the way, he returns; or if his journey began unawares on a dismal day, or if he stumbled at the threshold. If he see a snake unkilled, he fears a mischief; if the salt fall towards him, he looks pale and red, and is not quiet till one of the waiters have poured wine on his lap; and when he sneezeth, thinks him not his friend that uncovers not. In the morning he listens whether the crow crieth even or odd; and by that token presages of the weather. If he hear but a raven croak from the next roof, he makes his will; or if a bittour fly over his head by night; but if his troubled fancy shall second his thoughts with the dream of a fair garden, or green rushes, or the salutation of a dead friend, he takes leave of the world, and says he cannot live. He will never set to sea but on a Sunday; neither ever goes without an *erra pater* in his pocket. St. Paul's day, and St. Swithin's, with the twelve, are his oracles, which he dares believe against the almanac. When he lies sick on his death-bed, no sin troubles him so much as that he did once eat flesh on a Friday; no repentance can expiate that: the rest need none. There is no dream of his without an interpretation, without a prediction; and if the event answer not his exposition, he expounds it according to the event. Every dark grove and pictured wall strikes him with an awful but carnal devotion. Old wives and stars are his counsellors; his night-spell is his guard, and charms his physicians. He wears Paracelsian characters for the tooth-ache; and a little hallowed wax is an antidote for all evils. This man is strangely credulous, and calls impossible things miraculous; if he hear that some sacred block speaks, moves, weeps, smiles, his bare feet carry him thither with an offering; and if a danger miss him in the way, his saint hath the

thanks. Some ways he will not go, and some he dares not; either there are bogs, or he feigneth them; every lantern is a ghost, and every noise is of chains. He knows not why, but his custom is to go a little about, and to leave the cross still on the right hand. One event is enough to make a rule: out of these rules he concludes fashions proper to himself; and nothing can turn him out of his own course. If he have done his task, he is safe; it matters not with what affection. Finally, if God would let him be the carver of his own obedience, he could not have a better subject: as he is, he cannot have a worse."

Credulity and Superstition

"Credulity, although it is nearly allied to superstition, yet differs from it widely. Credulity is an unbounded belief in what is possible, although destitute of proof, and perhaps of probability; but superstition is a belief in what is wholly repugnant to the laws of the moral and physical world. Credulity is a far greater source of error than superstition; for the latter must be always more limited in its influence, and can exist only to a considerable extent in the most ignorant portions of society, whereas the former diffuses itself through the minds of all classes, by which the rank and dignity of science are degraded, its valuable labours confounded with the vain pretensions of empiricism, and ignorance is enabled to claim for itself the prescriptive right of delivering oracles amidst all the triumph of truth and the progress of philosophy. Credulity has been justly defined *belief without reason;* while scepticism, its opposite, is *reason without belief*, and the natural and invariable consequence of credulity; for it may be observed, that men who believe without reason are succeeded by others whom no reasoning can convince."—Dr. Paris's "Pharmacologia."

Superstition Natural to Man

Much of the belief in superstitions may be traced to the proneness of men to "turn the most indifferent circumstances into misfortunes," thus causing themselves to suffer as much from trifling accidents as from real evils; "as if the natural calamities of life were not sufficient." "I have known," says the Essayist, "the shooting of a star spoil a night's rest; and have seen a man in love grow pale, and lose his

appetite, upon the plucking of a merrythought. The screech-owl at night has alarmed a family more than a band of robbers; nay, the voice of a cricket hath struck more terror than the roaring of a lion. There is nothing so inconsiderable which may not appear dreadful to an imagination that is filled with omens and prognostics."

Table-turning

Mr. John Timbs, F.S.A., has the following excellent article on the above subject in his "Popular Errors":—

"In 1853 'this startling revelation of popular credulity' strangely occupied the public mind; and its effect was without due inquiry referred to electricity, to magnetism, to attraction, to some unknown or hitherto unrecognised physical power to affect inanimate bodies; to the revolution of the earth; and even to diabolical or supernatural agency. The main experiment consisted of a certain number of persons placing the palms of their hands upon a table; when in a few minutes it moved in various directions, according to the will of one of the party. Professor Faraday thus illustrates the fallacy of this result: 'Those who assert that a heavy body can be raised from the ground and be attracted towards the hand without exerting any reacting force on the hand that lifts it, make an assertion directly opposed to the laws of gravitation, and they ought at least to have examined the phenomena before arriving at such a conclusion. If a heavy body like a table could thus be raised in opposition to gravitation, surely it might be expected that the same power would be able to disturb the equipoise of a balance; but that it was unable to do. If such a power existed, which could attract without reaction, it would indeed be of the most important practical utility; for we might conceive its extension to such a point that the touch of a hand would draw a railway-train without effort.'

"Professor Faraday, believing that the first cause assigned, namely, a quasi-involuntary muscular action (for the effect is with many subject to the wish or will), was the true cause, the first point was to prevent the mind of the turner having an undue influence over the effects produced in relation to the nature of the substances employed. For this purpose, he provided an apparatus with index attached: it consisted of two small flat pieces of wood held

together by india-rubber springs, and separated by small rollers that allowed the pieces of wood to move freely over each other. The movement of the upper one was shown by an index, that pointed to the right or to the left according to the direction of the motion. This little apparatus, when placed under the hands of a practised table-turner, had the curious effect of paralysing his power when he looked at the index, and thus became conscious of the real movement of his hands; but when the index was concealed from view, the table began to turn as briskly as if the apparatus did not intervene. This proved that the movement of the table was effected by the direct action of the muscles exerted involuntarily.

"Again, Professor Faraday observes: 'The most valuable effect of this test-apparatus is the corrective power it possesses over the mind of the table-turner. As soon as the index is placed before the most earnest, and they perceive —as in my presence they have always done—that it tells whether they are pressing downwards only or obliquely, then all effects of table-turning cease, even though the parties persevere, earnestly desiring motion, till they become weary and worn out. No prompting or checking the hand is needed, *the power is gone;* and this only because the parties are made conscious of what they are really doing mechanically, and so are unable unwittingly to deceive themselves.'

"Upon phenomena being attributed unhesitatingly to a supposed faculty possessed by animated beings of developing in inert bodies a peculiar kind of electricity, Arago remarks:

"'What is apparently most extraordinary and most difficult to explain in the phenomenon of the tables,' says the *savant*, 'is the circumstance, that by means of, it may be said, infinitely small impulses impressed by the fingers on the mass of wood of which the table consists a very considerable degree of motion should at length be imparted to the table.' Arago then quotes from the 'Philosophical Transactions' Mr. Ellicot's experiments upon two pendulum-clocks, enclosed in separate cases, suspended from a wooden plank affixed to the same wall, and at a distance of 23½ English inches from each other. 'At first only one of these two clocks was going, the second clock was

at rest; after a certain time this second clock was found to have been set going by the imperceptible vibrations transmitted to its pendulum from the pendulum of the first clock through the medium of the intervening solid bodies. A very singular circumstance is, that after a certain time longer, while the pendulum of the second clock (the one which had first been at rest) vibrated in the largest arc which the construction of the clock would permit, the pendulum of the first clock, the one which at first was the only one going, had arrived at a state of entire rest.' Arago's object was to show that there already existed in science instances of communicated motion analogous to those which have been recently presented by turning tables, and of which the explanation does not require any of those mysterious influences to which recourse has been had in the case of the tables.'—' Meteorological Essays.'

" Professor Faraday, in a paper read to the Royal Institution, has ably illustrated the lamentable deficiency of judgment among what may be considered the educated classes of the present day, as exemplified in the belief in table-turning and other mania of this class. It will no less serve as an illustration of the extent to which minds not well regulated may be led astray, and as a warning against hastily drawing conclusions without a careful examination of the phenomena, especially when those conclusions are opposed to laws founded on the most careful investigations of the phenomena of nature by men of the highest scientific attainments.

" To guard against these erroneous conclusions, the importance of self-culture for preparing the mind for the exercise of correct judgment, and the necessity of accumulating facts and observations, and then accustoming the mind to reason upon them and to deduce conclusions from a great variety of well-established data, can scarcely be overrated.

" Next were exhibited several experiments, for the purpose of showing how easily anyone might be misled into false conclusions by the results of single experiments, and the necessity of accumulating facts in different ways before any sound judgment can be formed. Faraday alluded particularly to Arago's discovery of the influence on a suspended magnet of a rotating disc of metal immediately

beneath. No sooner was the phenomenon made known than numerous explanations of the cause were advanced by various persons without due consideration; but whilst they were so ready with their explanations, Arago himself was silent. The discoverer of the effect abstained from assigning any cause, for he felt that he was not in possession of sufficient facts to enable him to form a correct judgment; and it was not till some time after others had assumed a variety of erroneous causes that he was led to the conclusion that the effect was due to the excitement of electric currents. Professor Faraday reverted from time to time to the table-turning delusion and to spirit-rapping as evidence of the ill-regulated condition of the public mind; and he denied the right of those who adduced phenomena opposed to the recognised laws of nature to demand an explanation of the cause from others. If asked to explain all the phenomena, he would not undertake to do so, any more than he could explain all the tricks of a conjuror; but because he did not know the cause, he was not to assume that the laws of nature were suspended or reversed. In the self-culture of the mind, humility is essentially requisite; for without a full conviction of the liability to err, there would not be that painstaking so necessary to the discovery of truth. The little attention that is generally paid to cultivate the judgment was alluded to in conclusion, as one of the anomalies of this educational age; for whilst a large portion of time is frequently devoted to acquiring an indifferent knowledge of a mechanical musical instrument, that infinitely superior instrument, the mind, is generally neglected."

Sailors' Omens

The following article appeared in the *Evening Standard* some fourteen years ago:—

"Gallant as seamen are always supposed to be, it seems singular to find that they should harbour so many superstitious beliefs in regard to the fair sex. The bulk of their most popular songs are confined solely to sentimental recollections, to anticipations of joy, or to chronicling the doings of the lasses whom they admire; and yet, if the omens to which they give credence are worth anything, they must have a wholesome, or rather unwholesome, horror

of womankind. There is, possibly, some connection between the nautical dread and the ancient belief that witches could raise storms, or that mermaids delighted in luring innocent sailor lads to destruction. Scotch fishermen carry the superstitious belief to such an extent that they hold the mere wishing them good luck by a woman will bring about ill fortune, while some entertain the idea that to meet a woman with flat feet is a sure harbinger of evil. Many fishermen entertain the belief that if a woman be the first to cross a stream on May Day no fish will be caught throughout the whole year, while others contend that should a woman step over a fishing rod no fish will bite. The belief is almost universal amongst sailors that priests on board a vessel bring bad weather, while some hold that even to meet a parson before setting out on a voyage is unlucky. After women and priests sailors object most strongly to cats, probably founding their faith unconsciously on the old Finnish fancy that Husi, the Demon of Storms, was attended by cats. Teasing a cat is supposed to bring about a gale, while drowning it is a certain way to court a tempest, and should a cat be on board ship, and indulge in the frolicsome behaviour of the playful feline species, bad weather is sure to follow. Among the Brittany seafarers there is a song which indicates how the actions of the cat are to be interpreted. If it purr, it is a good omen; if it turn its back to the fire, the boat will upset; and if it burn its claws, it is absolutely fatal to the crew. If the cat rub its ear, the helmsman will be unable to steer; and if it wipe its face with its paw, ill-luck will follow. With so many evil indications, and only one presage of good fortune—the purring—it is not remarkable that seamen object to having a cat on their ship.

"Everybody knows that whistling on board ship is prohibited, because the mere process aggravates the storm demons, and sets them to their mischievous work. On the other hand, it is permissible in a storm to whistle for a breeze, and it is, of course, superfluous to say that the process is generally, if not always, successful. Some of the superstitions which sailors entertain are almost poetical in their conception. Thus it is stated by Bassett, in his 'Legends and Superstitions of the Sea,' that in Iceland a spider, when hanging down by its web, must not be dis-

turbed. You must put your hand under it and say, 'Up, up, fishing Carl; your wife lies ill in child-bed." Or else you must say, 'Row up from below, fishing Carl, if you betoken fair weather; row down if you betoken foul.' Amongst all the superstitions of sailors few appear to be of good portent. Almost all are the reverse. It is considered unlucky to sew sails on the quarter-deck, while to tear the colours is a fatal disaster. To turn a hatch cover upside down is disastrous, and it is always recognised as an undeniable fact that losing a swab or bucket overboard will bring bad luck; but so fatal is the result of handing anything through the rungs of a ladder that only the merest ignoramus or the wildest devil-may-care would ever think of doing it. We have superstitious beliefs on shore concerning the spilling of salt, but the Dutch seamen go to the wild extent of thinking that a ship will be wrecked each time a salt-cellar is overturned. A similar fancy attaches to the apparently harmless loaf of bread; the idea being nourished in some districts that for every loaf turned upside down a ship will be lost at sea. Amongst Spanish sailors there is an idea that it is unlucky to place the left foot first on shore when disembarking, and the Iceland superstition holds that to cast a stone over a ship is to ensure her capsizing as soon as she gets free of the harbour. The Pomeranians carry their beliefs to the furthest extremes. Thus, you must not throw overboard a burning coal, or you will have a storm. When the wind is contrary you must not sew or mend anything, for you sew up the wind and court disaster; but in a fair breeze there is no danger, for you enclose the wind by your sewing and keep it fair. You should not speak to the wind when it is good, or it will change, and it resents any fears of its permanency; nor must you calculate when a good breeze will carry you into port, as a change is sure to follow immediately upon your doing so.

"Where many nautical superstitions have had their origin would be a matter of impossibility to determine; but exactly the same may be said of many of the fancies obtaining on shore. The ancient soothsayers were in the constant habit of drawing their auguries from the actions of birds, and perhaps some of their notions may have influenced sailors in their superstitions. Crows and magpies have been birds of ill-omen from time immemorial, and we can forgive the

credulous Jack Tars for attaching some kind of importance to the movements of carrion-eating fowl; but when such a man as Nelson is found regarding the appearance of a small land bird on board his ship as a good omen and presage of victory, as occurred just before the battle of the Nile, we begin to wonder where superstition is to end. A quaint old ballad may be quoted in regard to one familiar bird:—

"'Ah, well a day!' the sailor said,
'Some danger doth impend:
Three ravens sit in yonder glade,
And evil will happen, I'm sore afraid,
Ere we reach our journey's end.'
'And what have the ravens with us to do?
Does their sight betoken us evil?'
'To see one raven's lucky, 'tis true,
But it's certain misfortune to light upon two,
And meeting with three is the devil.'

"The dove has always been a bird of good omen to sailors, presumably from some association of ideas with the bringing back of the leaf to the ark, when Noah sent out one of the species on an expedition of exploration; and it received due veneration in consequence. The Chinese sailors pay great respect to the raven, on the principle, no doubt, that it is well to be civil to those who can do us an injury. Birds have always been considered by seamen to be better judges of the weather than themselves. When sea-fowl fly landward, bad weather is coming; and when they chatter and preen their feathers, it is in preparation for approaching storms. The landing of a sea-gull is a certain indication of coming bad weather, as is the low flying of all birds. The stormy petrel, who is said to take his name from the Italian *Petrello*, meaning Little Peter, because he was supposed to walk on the waves, like the saint after whom he is christened, is universally believed to be a forerunner of storms. And there are few seamen, in even the present enlightened age, who would disregard the warning given by Mother Cary's Chickens—*Mater Cara* familiarised. The French, who entertain regarding this bird the same notions as all other seafarers, call it *L'Oiseau de Notre Dame.* Channel fishermen imagine that the flight of the curlew causes the east wind, which they seldom regard with great favour, and when the swan is seen floating on the sea fine weather is considered as a certainty. The lights due to electric agency,

which sailors call St. Elmo's candles, and which are, of necessity, seen only under disturbed meteoric conditions, are supposed by some to be the souls of sailors come to warn their comrades of storm and danger, while others assert it is an evil spirit which will disappear when the sign of the Cross is made. According to Dr. Brewer, 'If only one flame showed itself, the Romans called it Helen, and said that it portended the worst of the storm was yet to come; but two or more luminous flames they called Castor and Pollux, and said that they boded the termination of the storm.' Horace makes a reference to St. Elmo's candles:—

"'But when the sons of Leda shed
Their star-lamps on our vessel's head,
The storm-winds cease, the troubled spray
Falls from the rocks, clouds flee away,
And on the bosom of the deep
In peace the angry billows sleep.'"

Thought-Reading.

The thought-reading that we are about to deal with is that usually practised in drawing-rooms, and of which Mr. Alfred Capper is such a clever exponent. Some years ago, when we had the pleasure of witnessing one of Mr. Capper's performances, we were delighted that he started by saying, "... *So-called* thought-reading, for I do not believe anyone has ever been able to read another's thoughts." We think this is especially praiseworthy in one who partly depends for his support upon the over-credulity of the public in such matters.

The usual method adopted in such an exhibition is for the performer to leave the room, and while he is absent those in the room arrange what they will "will" him to do. This generally consists of taking some article from one part of the room and placing it in another, or giving it to someone in the room, the finding of a hidden pin, or it may be the removal of a ring, or brooch, from one person and the fixing of it in a similar position on another, after touching several articles with it. One of the party is chosen to act as medium, that is, he or she holds one hand or wrist of the performer when he re-enters; or the performer may hold the medium's hand to his forehead; or there may be two mediums, and they may encircle the top part of the performer's head (or lower part of his neck) with their hands.

Everybody is told to think intently of what has to be done, and the performer has to "make his mind a blank."

If he be blindfolded it makes the illusion all the better, and he is perhaps himself aided thereby. With those who have had a little practice, and when the medium is a suitable one, for much depends on this, the performance is usually fairly satisfactory and takes very well.

Now let us see if we can study what takes place. The performer having left the room, the audience determine what he shall do on his return, and in settling this they look about the room until something suitable occurs to them. The thought of this "something" is produced by a certain definite environment, and if the performer can be brought into the same environment he will be very likely to have the same thought, the only difficulty is to suppress that part of his environment which has no bearing on the test. The performer, when he comes into the room and is held by the wrist, let us say, has first of all to find out in which part of the room he is wanted. This he does by almost imperceptibly trying to go in some direction or another, and if he finds the least unwillingness on the part of the medium to let him, he knows that the direction is wrong. He then tries again in different directions till he finds there is no unwillingness, and then goes that way. We may say at once that we *quite* believe many mediums are entirely unconscious of thus influencing the performer; in fact, the writer has more than once had a medium who had never heard of thought-reading, much less taken part in it; but it is very necessary that the medium should not be antagonistic to the success of the show, or he will—also perhaps unconsciously—resist the performer when the latter does want to go the right way. In fact, as we are always told, the medium must "will intently what has to be done." Having come into the neighbourhood of the article to be removed or dealt with, the performer (who we are supposing is blindfolded) feels about him and takes up or touches some article, and in a very similar way to that in which he decided in which direction to walk, he decides whether it is the correct article or not; the suppressed excitement (not to say whispers) of the audience may also aid him. He is then in at least part of the environment which suggested to the audience what he should be made to do; hence he is very likely to have the same thoughts. For example,

if the article were a ring he would not place it in the fire, but would think of taking it to someone. Or, if it were a piece of music, he would not think of lighting the gas with it, but of putting it on the piano; whereas a spill *would* suggest lighting something; and so on to the end of the performance.

The above may sound a long and complicated process, but it takes very much less time to do it than it does to write about it, and the resistance or willingness that has been spoken of is excessively delicate. It gives one far too crude an idea of it to call it "leading," though it would be correct to call it in mathematician's language an "element of leading." Some years ago a lady friend of the author's, who is particularly clever at this so-called thought-reading, very kindly allowed him to arrange a number of tests to bring out certain facts in connection with the matter, and he was greatly struck how exceedingly sensitive the performer was to the smallest "element of leading," so small, in fact, that at times he was scarcely conscious of it himself! This lady was a great believer in thought-reading, and, as far as we know, she was quite unconscious of how she did her very successful performances.

A more correct, though less taking title for this subject, would be "muscle-reading."

With the foregoing explanation it is quite clear why you cannot successfully "will" a performer to *speak* or write any particular sentence, or, indeed, to speak at all except by chance. Similarly you may get them to play the piano or some other instrument, or to sing; but in the vast majority of cases they will not play or sing the particular tune "willed," and in those cases in which they do, it is mere coincidence.

If it were possible for the performer actually to read the medium's thoughts while in contact with him in any of the methods mentioned, then the performer should be able, after a certain length of contact, while standing still, to go and do the whole performance *without the medium having contact with him.* This, we need hardly say, cannot be done.

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